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JANUARY, 2021

SERVICE MANUAL

MODEL: OL45

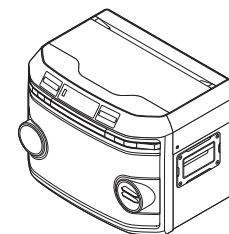


# MINI HI-FI AUDIO SERVICE MANUAL

**MODEL: OL45**

## CAUTION

BEFORE SERVICING THE UNIT, READ THE "SAFETY PRECAUTIONS" IN THIS MANUAL.



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# SECTION 1

## SUMMARY

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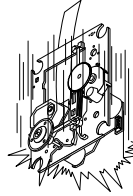
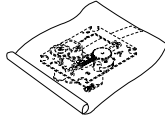
# SERVICING PRECAUTIONS

## NOTES REGARDING HANDLING OF THE PICK-UP

### 1. Notes for transport and storage

- 1) The pick-up should always be left in its conductive bag until immediately prior to use.
- 2) The pick-up should never be subjected to external pressure or impact.

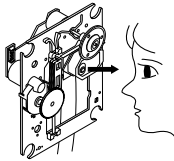
Storage in conductive bag



Drop impact

### 2. Repair notes

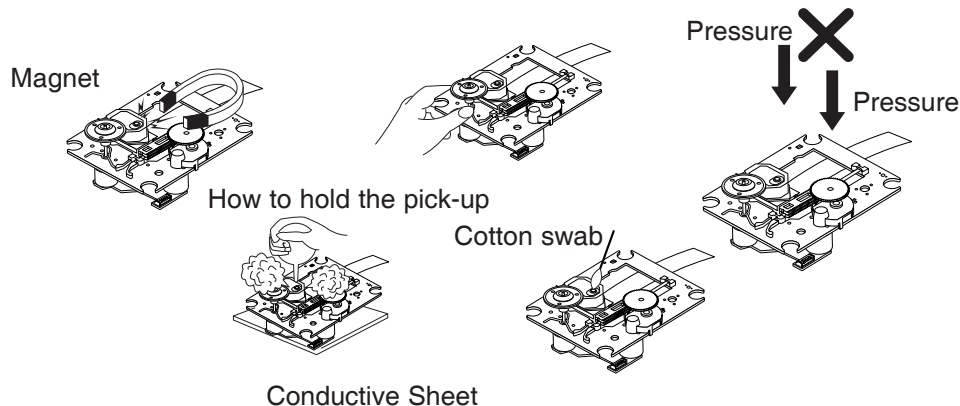
- 1) The pick-up incorporates a strong magnet, and so should never be brought close to magnetic materials.
- 2) The pick-up should always be handled correctly and carefully, taking care to avoid external pressure and impact. If it is subjected to strong pressure or impact, the result may be an operational malfunction and/or damage to the printed-circuit board.
- 3) Each and every pick-up is already individually adjusted to a high degree of precision, and for that reason the adjustment point and installation screws should absolutely never be touched.
- 4) Laser beams may damage the eyes!  
Absolutely never permit laser beams to enter the eyes!  
Also NEVER switch ON the power to the laser output part (lens, etc.) of the pick-up if it is damaged.



NEVER look directly at the laser beam, and don't allow contact with fingers or other exposed skin.

### 5) Cleaning the lens surface

If there is dust on the lens surface, the dust should be cleaned away by using an air bush (such as used for camera lens). The lens is held by a delicate spring. When cleaning the lens surface, therefore, a cotton swab should be used, taking care not to distort lens.



### 6) Never attempt to disassemble the pick-up.

Spring has excess pressure. If the lens is extremely dirty, apply isopropyl alcohol to the cotton swab. (Do not use any other liquid cleaners, because they will damage the lens.) Take care not to use too much of this alcohol on the swab, and do not allow the alcohol to get inside the pick-up.



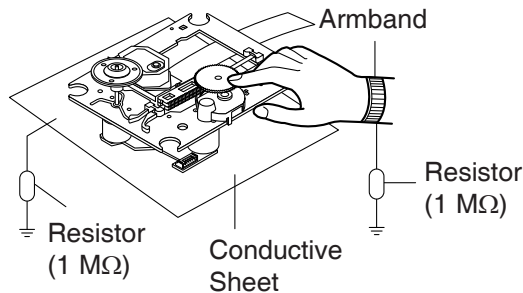
## NOTES REGARDING COMPACT DISC PLAYER REPAIRS

### 1. Preparations

- 1) Compact disc players incorporate a great many ICs as well as the pick-up (laser diode). These components are sensitive to, and easily affected by, static electricity. If such static electricity is high voltage, components can be damaged, and for that reason components should be handled with care.
- 2) The pick-up is composed of many optical components and other high-precision components. Care must be taken, therefore, to avoid repair or storage where the temperature or humidity is high, where strong magnetism is present, or where there is excessive dust.

### 2. Notes for repair

- 1) Before replacing a component part, first disconnect the power supply lead wire from the unit
- 2) All equipment, measuring instruments and tools must be grounded.
- 3) The workbench should be covered with a conductive sheet and grounded.  
When removing the laser pick-up from its conductive bag, do not place the pick-up on the bag. (This is because there is the possibility of damage by static electricity.)
- 4) To prevent AC leakage, the metal part of the soldering iron should be grounded.
- 5) Workers should be grounded by an armband (1 M $\Omega$ )
- 6) Care should be taken not to permit the laser pick-up to come in contact with clothing, in order to prevent static electricity changes in the clothing to escape from the armband.
- 7) The laser beam from the pick-up should NEVER be directly facing the eyes or bare skin.



# ESD PRECAUTIONS

## Electrostatically Sensitive Devices (ESD)



Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive Devices (ESD). Examples of typical ESD devices are integrated circuits and some field-effect transistors and semiconductor chip components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ESD devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ESD devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ESD devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESD devices.
6. Do not remove a replacement ESD device from its protective package until immediately before you are ready to install it. (Most replacement ESD devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive materials).
7. Immediately before removing the protective material from the leads of a replacement ESD device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

**CAUTION : BE SURE NO POWER IS APPLIED TO THE CHASSIS OR CIRCUIT, AND OBSERVE ALL OTHER SAFETY PRECAUTIONS.**

8. Minimize bodily motions when handling unpackaged replacement ESD devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ESD device).

## CAUTION. GRAPHIC SYMBOLS

|   |   |
|---|---|
|  | THE LIGHTNING FLASH WITH APOWHEAD SYMBOL. WITHIN AN EQUILATERAL TRIANGLE, IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF UNINSULATED "DANGEROUS VOLTAGE" THAT MAY BE OF SUFFICIENT MAGNITUDE TO CONSTITUTE A RISK OF ELECTRIC SHOCK. |
|  | THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF IMPORTANT SAFETY INFORMATION IN SERVICE LITERATURE.  |

# PROGRAM DOWNLOAD GUIDE

## 1. MAIN MCS PROGRAM (MAIN MCS CHIP)

**Download program file name must be MAIN\_OL45\_HAC\_YYMMDDX.bin**

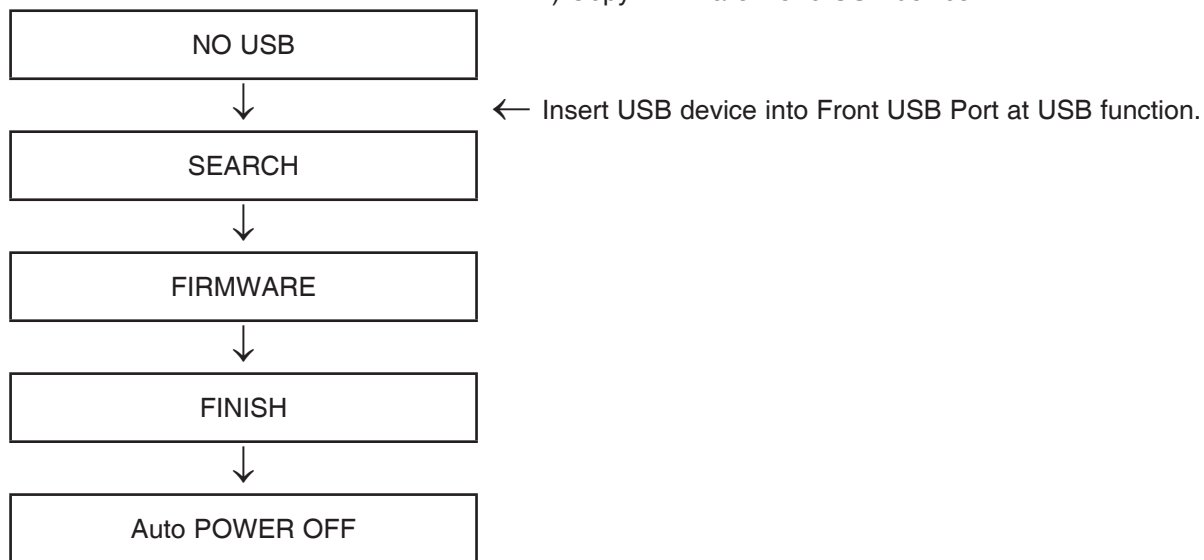
If security program(Water Wall) is activated on PC, you must save the file to the USB storage device and disable the security software, then download the file to your set.

Downloading file proceeds at USB function.

**Caution:** When downloading the file, you should neither unplug the USB device, change to the other function, nor power off the device. USB device must be unplugged when the downloading process is completed.

### ON VFD DISPLAY SCREEN

- 1) (Fast) Format USB device.
- 2) Copy Firmware file to USB device.



## 2. OPTION & EQ PROGRAM

### Download program file name must be EQ\_OL45\_HAC\_YYMMDDX.BIN

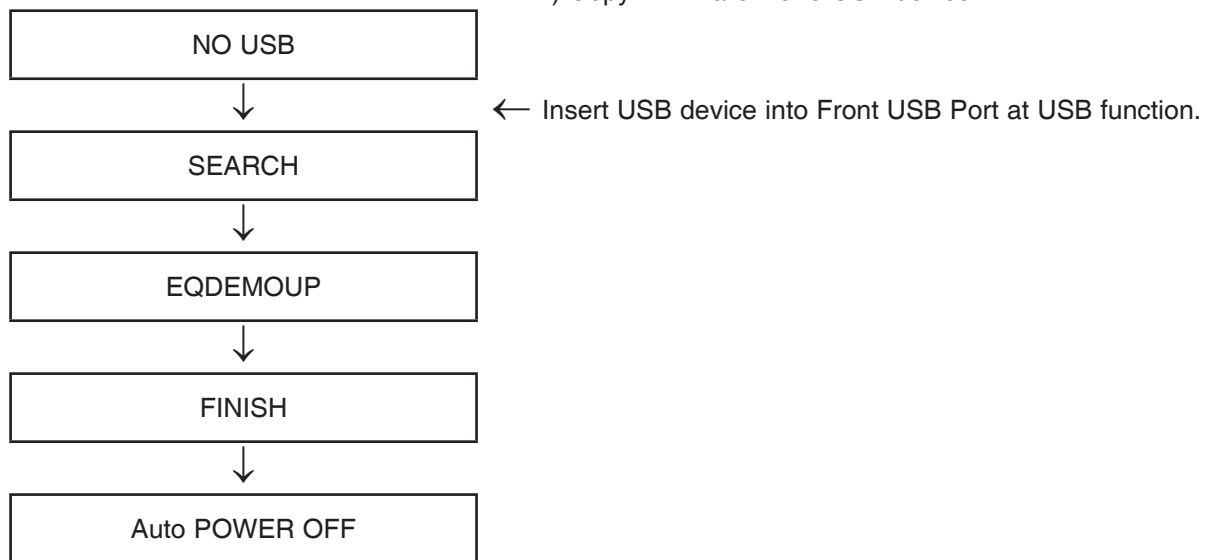
If security program(Water Wall) is activated on PC, you must save the file to the USB storage device and disable the security software, then download the file to your set.

Downloading file proceeds at USB function.

**Caution:** When downloading the file, you should neither unplug the USB device, change to the other function, nor power off the device. USB device must be unplugged when the downloading process is completed.

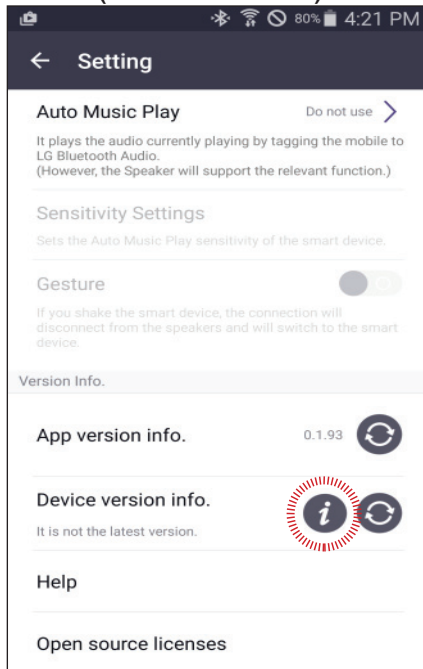
### ON VFD DISPLAY SCREEN

- 1) (Fast) Format USB device.
- 2) Copy Firmware file to USB device.



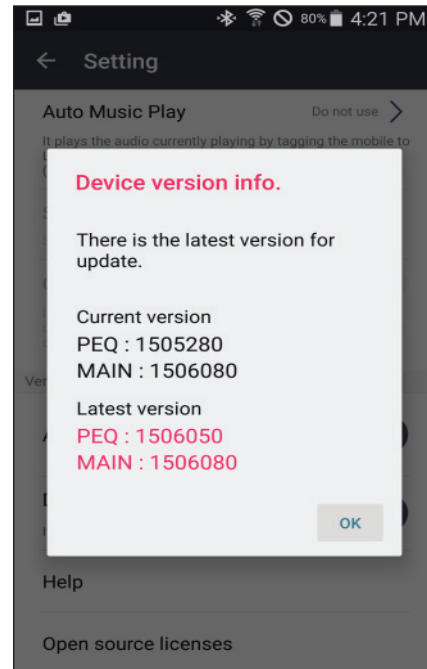
# FOTA UPDATE STEP USING BT APP

## Step1 : App connecting (Check FW version)



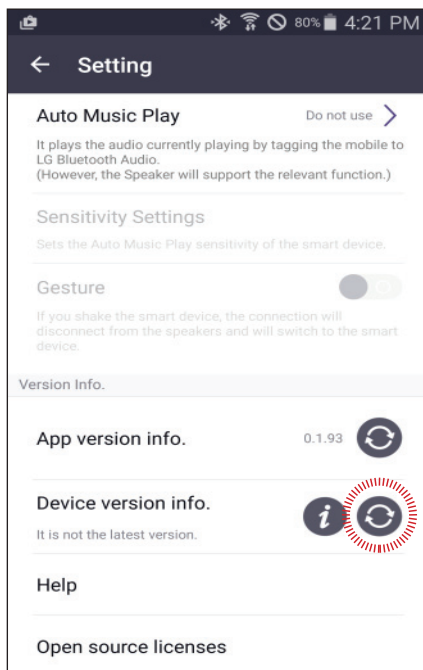
After connecting the BT App with SET,  
the user could find the “Device Version info”  
on Setting tab.

## Step2 : Device version info



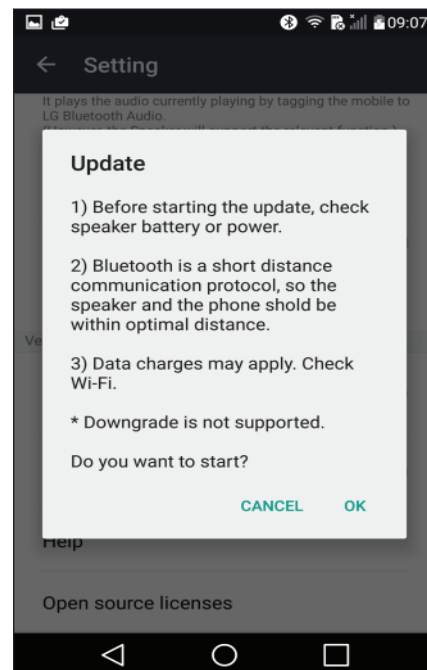
When touch the “Device Version info”,  
user could find the current and latest SET  
version on pop-up menu.

## Step3 : Select update button



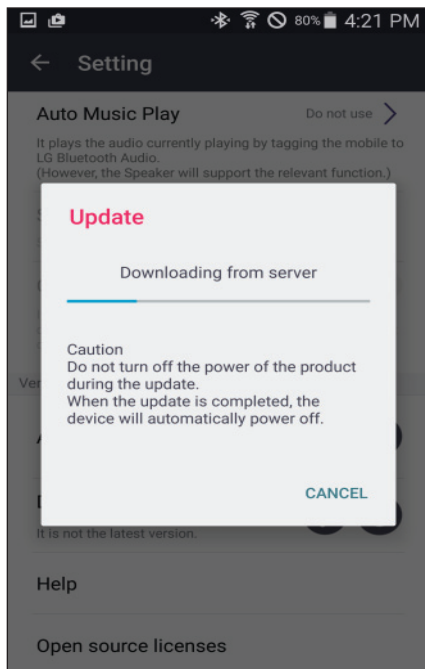
When touch the “Update” button, user could  
update the SET firmware using FOTA.

## Step4 : Confirm update



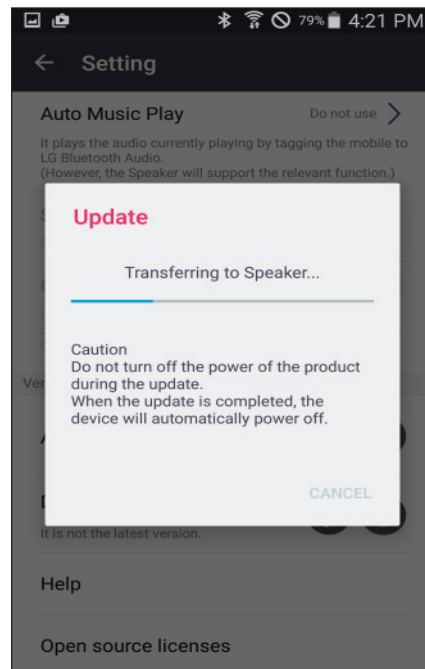
Select the OK button on the caution message.

### Step5 : Download from CDN server



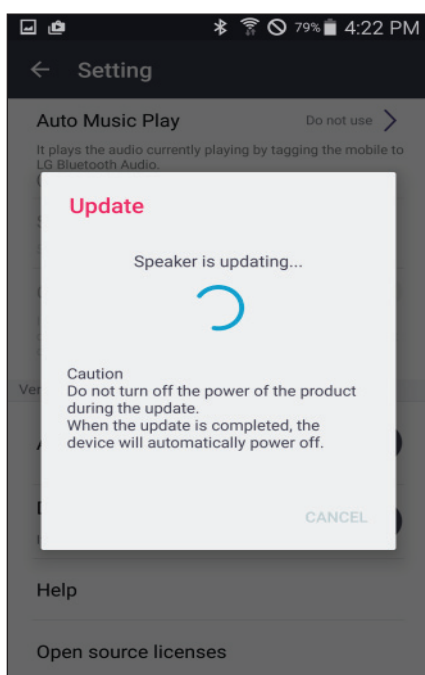
1st step is download from CDN server to smart phone. The progress bar is displayed on BT App.

### Step6 : Transfer FW



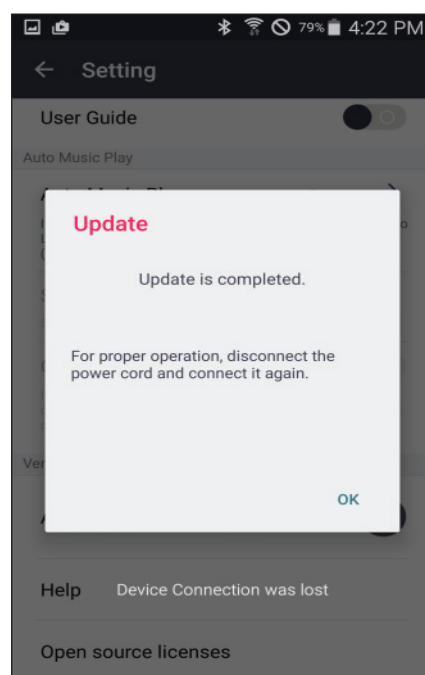
After completed the download from server, smart phone start to transfer the firmware to the SET. The progress bar is displayed on BT App.

### Step7 : FW Flash Writing



After completed the download from the smart phone, the SET overwrite the firmware to flash memory.

### Step8 : FOTA complete



When finishing the flash memory writing, pop-up message about finish is displayed and the SET auto power off.

# SPECIFICATIONS

- **GENERAL**

Power requirements  
Power consumption  
Dimensions (W x H x D)  
Operating temperature  
Operating humidity

Refer to the main label on the unit.  
Refer to the main label on the unit.  
Approx. 455 mm x 320 mm x 310 mm  
5 °C to 35 °C  
60 %

- **INPUTS/ OUTPUTS**

Analog audio in (AUX IN)  
Analog audio out (AUX OUT)  
Portable in (PORT. IN)  
Microphone(MIC)

1 kHz, RCA jack L/R x 1  
1 kHz, RCA jack L/R x 1  
1 kHz, 3.5mm Stereo jack x 1  
1 kHz, 6.3mm jack x 1

- **TUNER**

FM Tuning Range

87.5 to 108.0 MHz or 87.50 to 108.00 MHz

- **SYSTEM**

Frequency Response  
Signal-to-noise ratio  
Dynamic range  
Bus Power Supply (USB)

40 to 20,000 Hz  
More than 75 dB  
More than 80 dB  
5 V  $\overline{\text{DC}}$  500 mA

- **AMPLIFIER (RMS Output power)**

Total output

220 W(4  $\Omega$  at 1 kHz, THD 25 %)

- Design and specifications are subject to change without notice.

**SECTION 2**

**CABINET & MAIN CHASSIS**

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# DISASSEMBLY INSTRUCTIONS

1) Remove the five screws on the back.

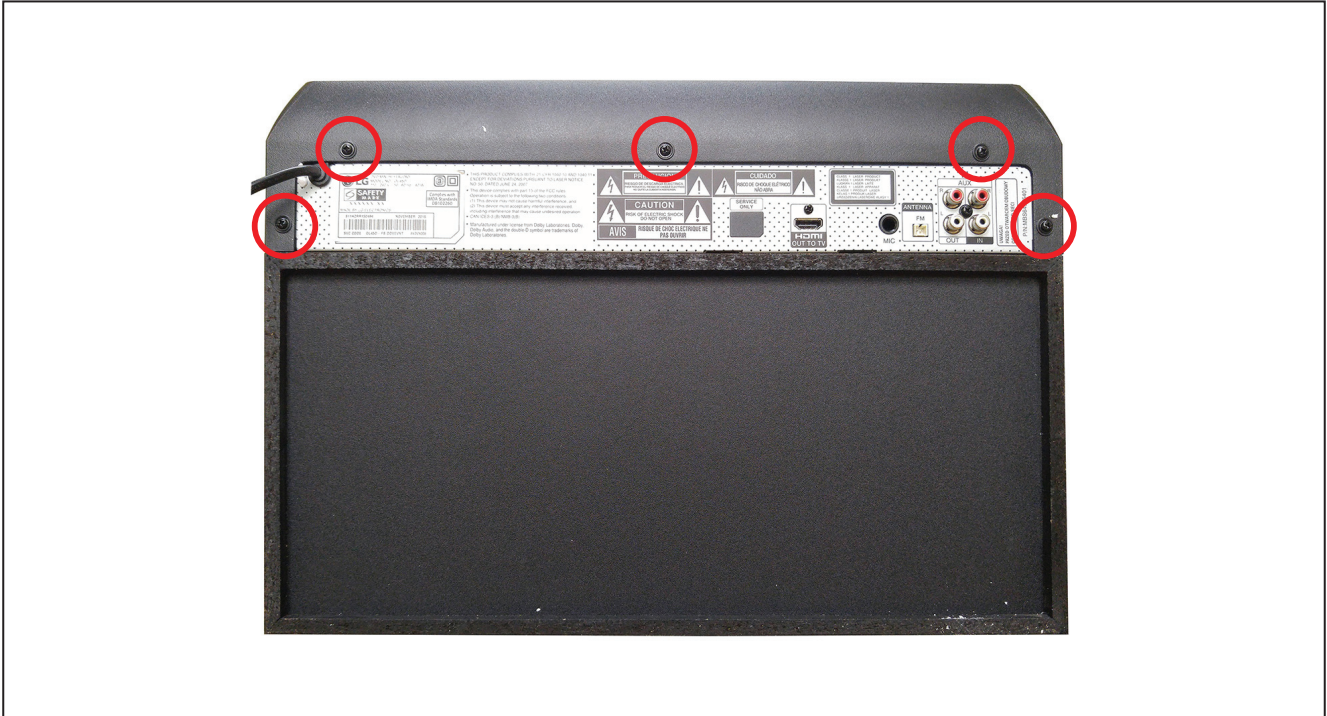


Figure 1

2) Disassemble each of the screws on the left and right sides.



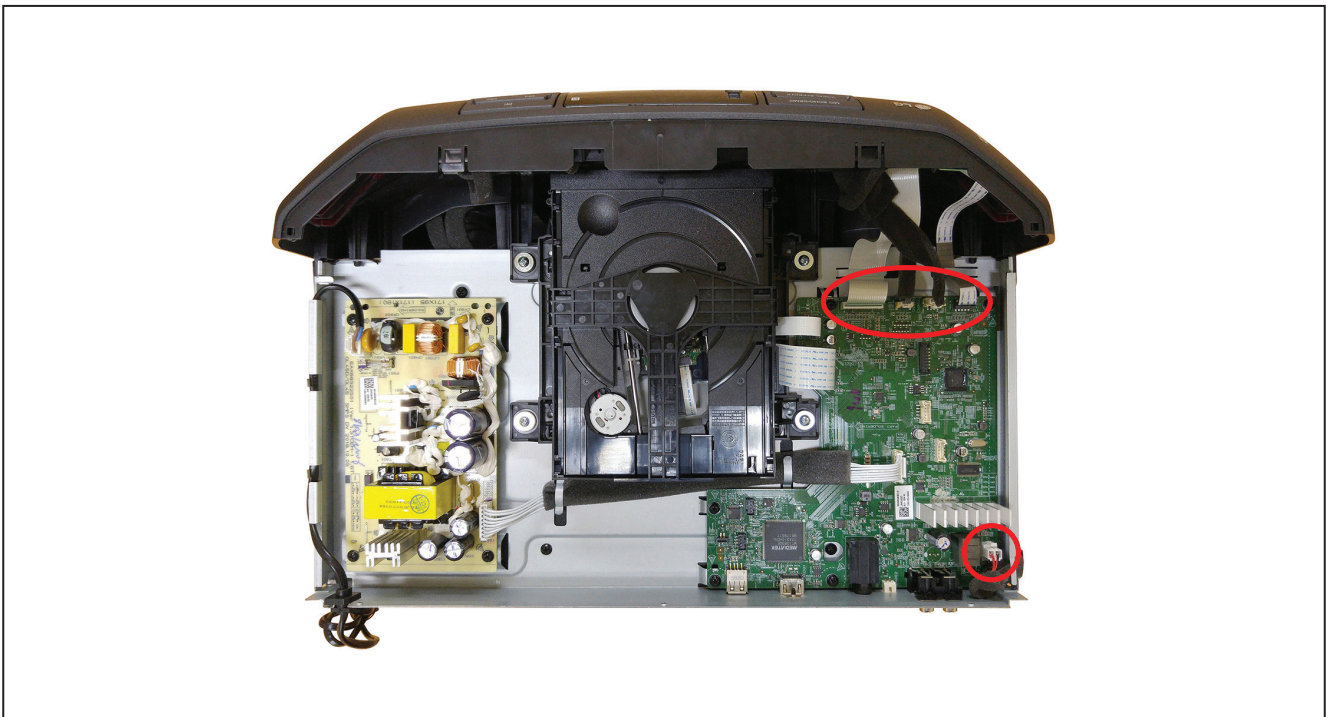
Figure 2

3) Remove the top cover by lifting it from the back to the top.



**Figure 3**

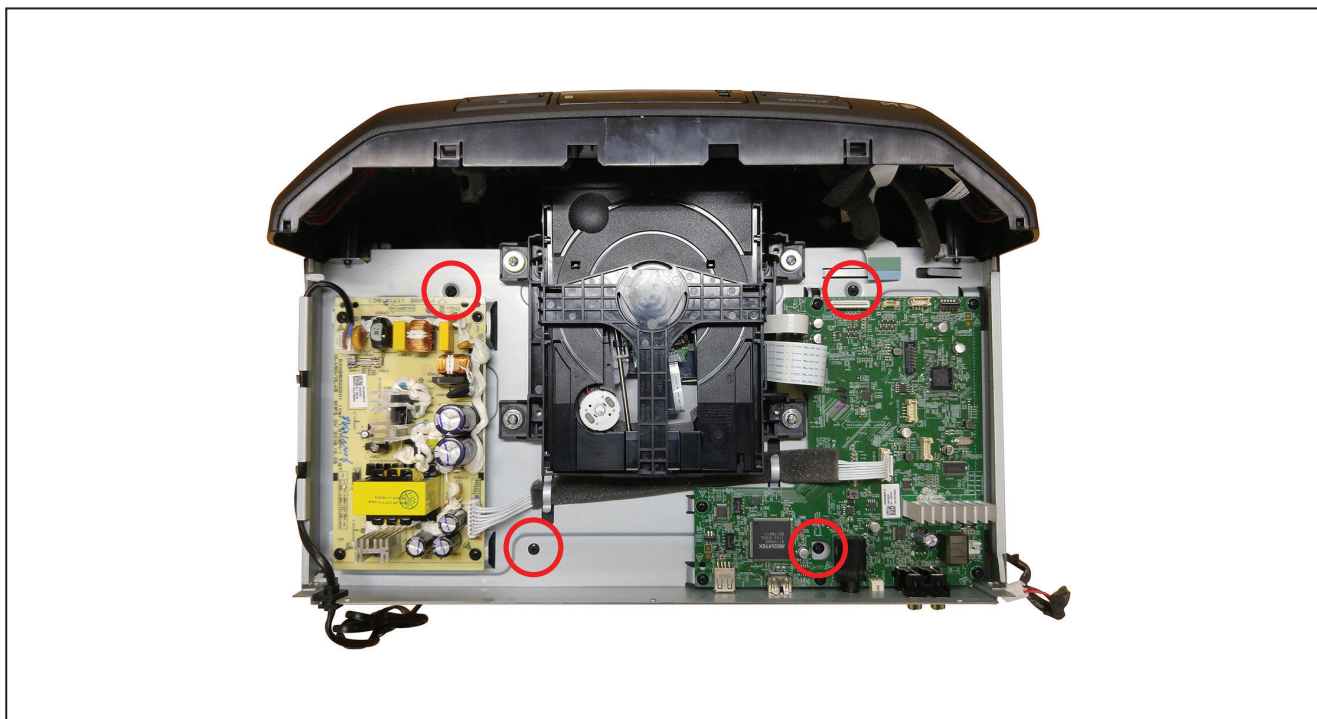
4) Disassemble the cable connectors on the MAIN PCB.



**Figure 4**

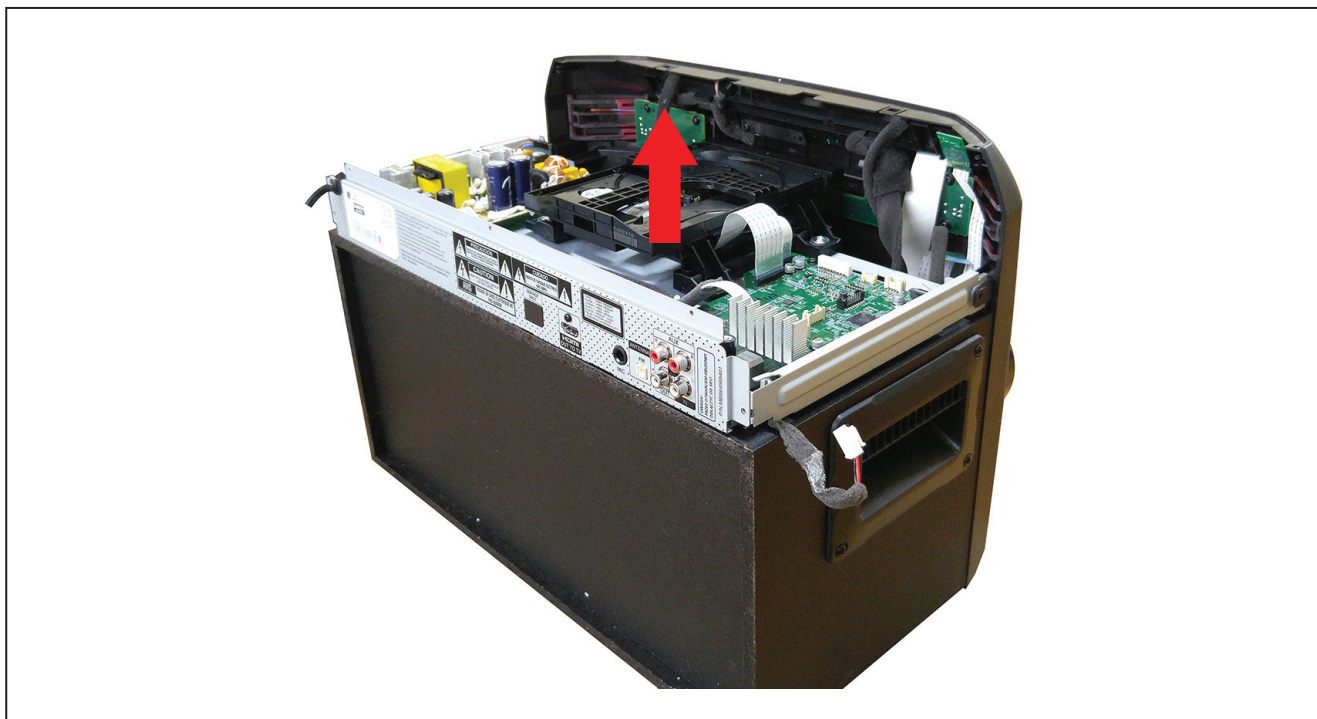


5) Remove the four screws of the Main Chassis.



**Figure 5**

6) Release the left and right hooks and lift up the Main Chassis.



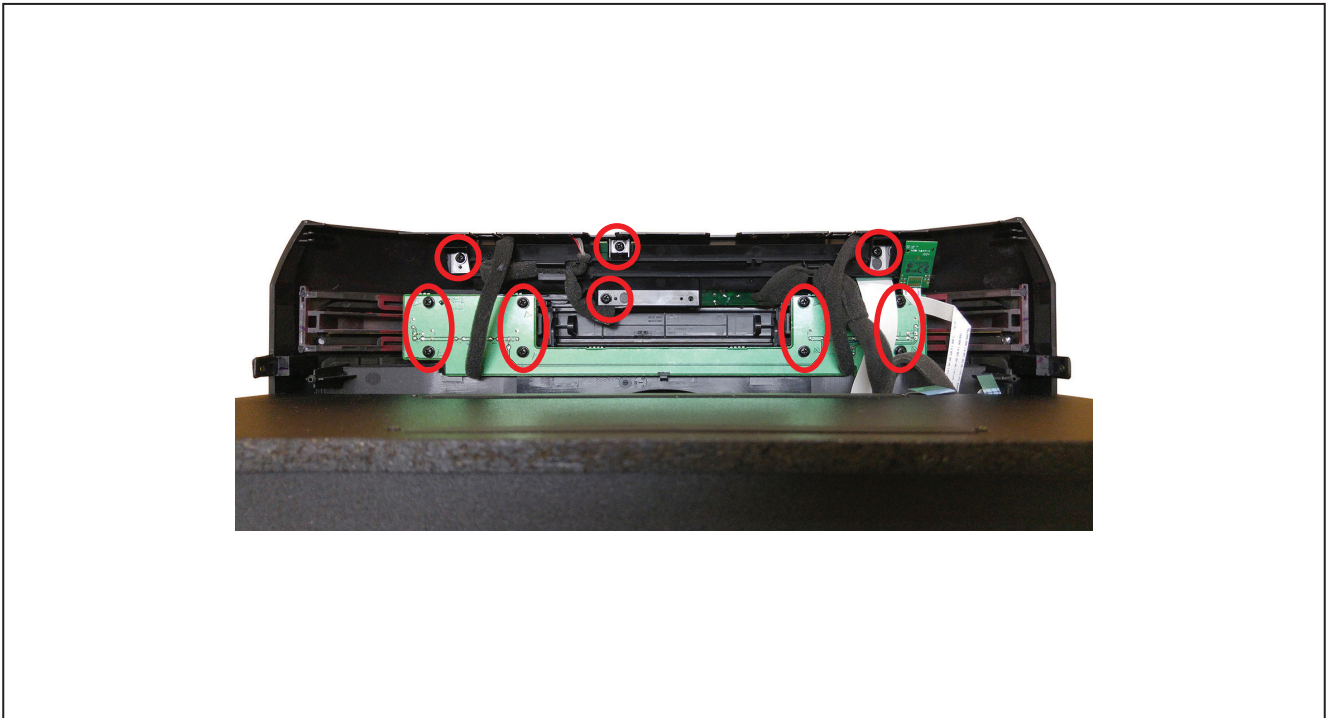
**Figure 6**

7) Remove the Main Chassis from the Wood Chamber.



**Figure 7**

8) Remove the 12 PCB fixing screws on the front panel.



**Figure 8**

9) Disassemble PCB holder and Button PCB from Front Panel.

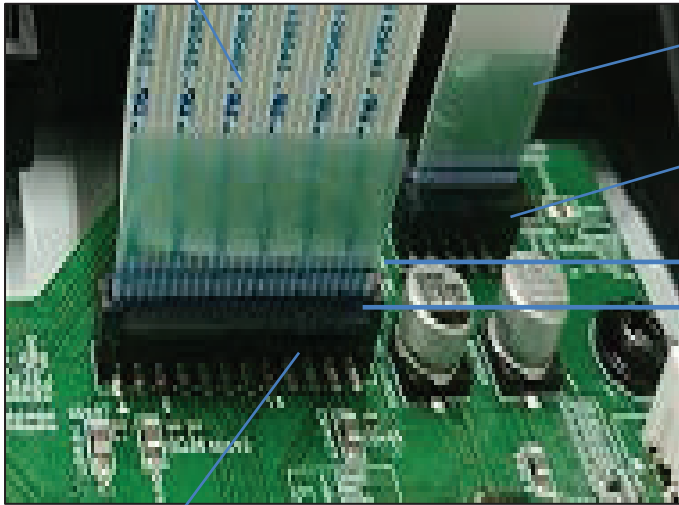


**Figure 9**

# MD FFC INSERTION GUIDE

1. Insert FFC Cable\_Pick Up into Connector\_Pick Up until it is no longer inserted vertically.  
(Also, insert FFC Cable\_Loading into Connector\_Pick Up with the same disinfection.)
2. Insert as shown in 1 and check the FFC Cable Line level of A based on B.  
(A and B do not always match. )

FFC Cable\_Pick Up



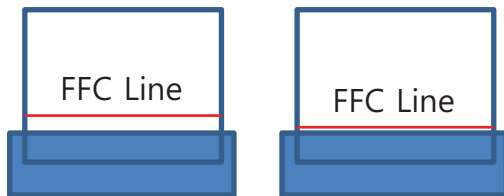
FFC Cable\_Loading

Connector\_Loading

A : FFC Cable Line

B : Connector

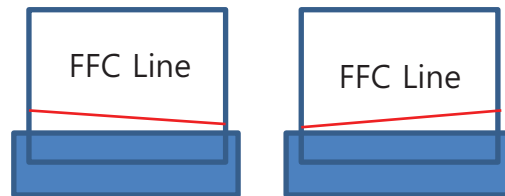
Connector\_Pick Up



Connector

Connector

Case 1 : OK



Connector

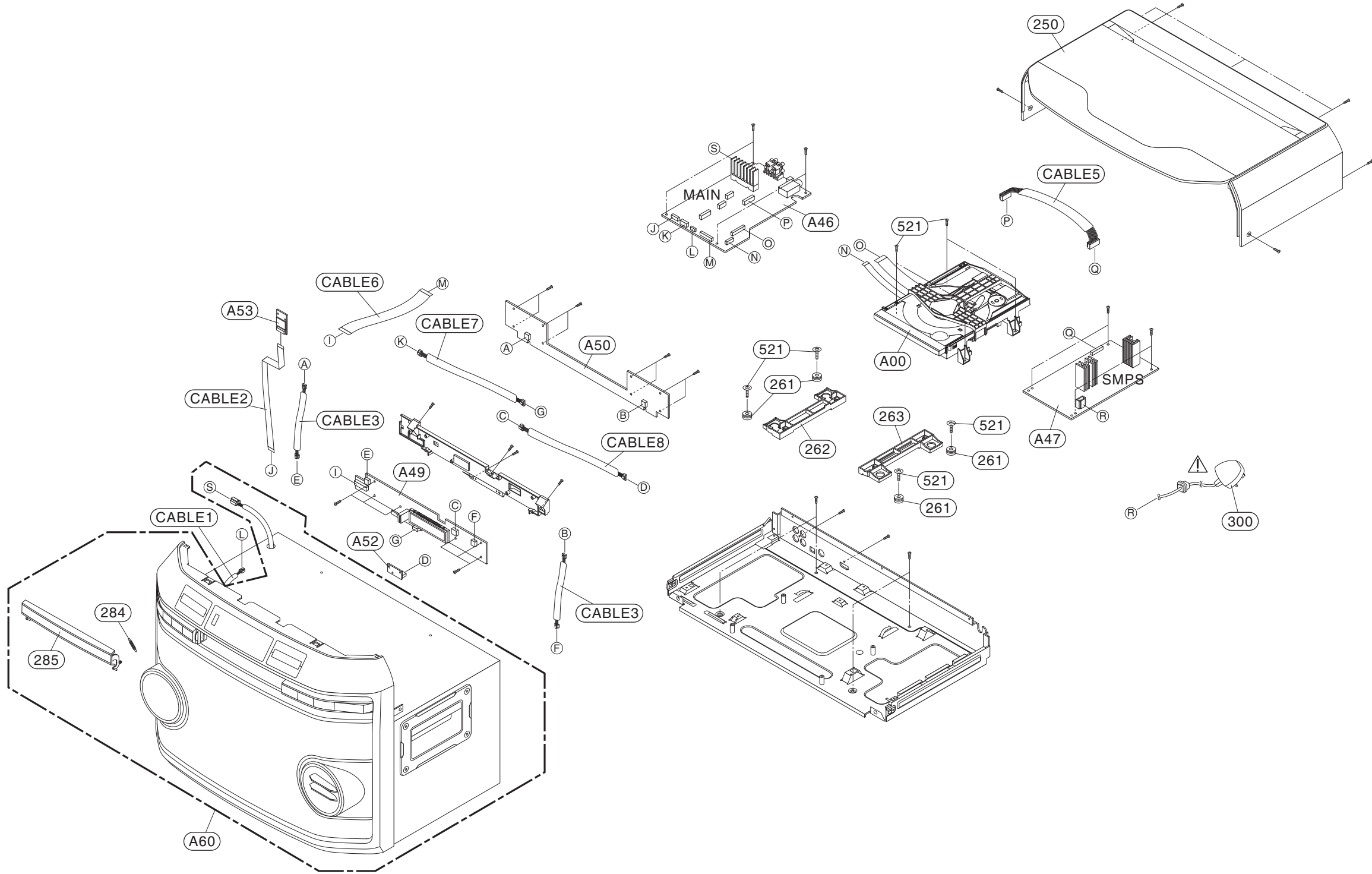
Connector

Case 2 : NG

# MEMO

EXPLODED VIEWS  
1. CABINET AND MAIN FRAME SECTION

NOTES) THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF IMPORTANT SAFETY INFORMATION IN SERVICE LITERATURE.



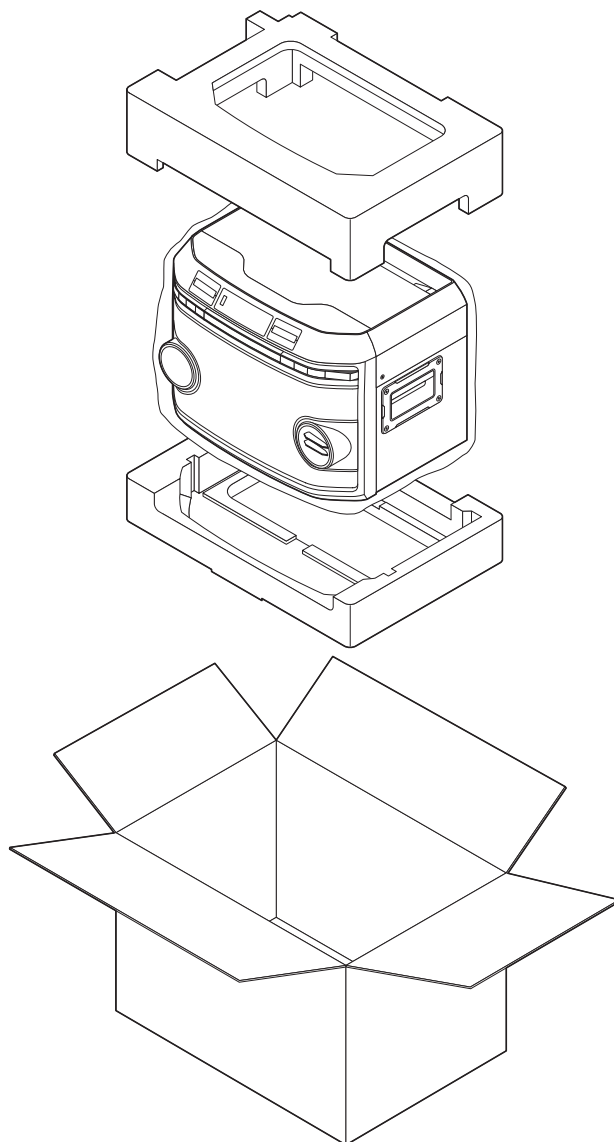
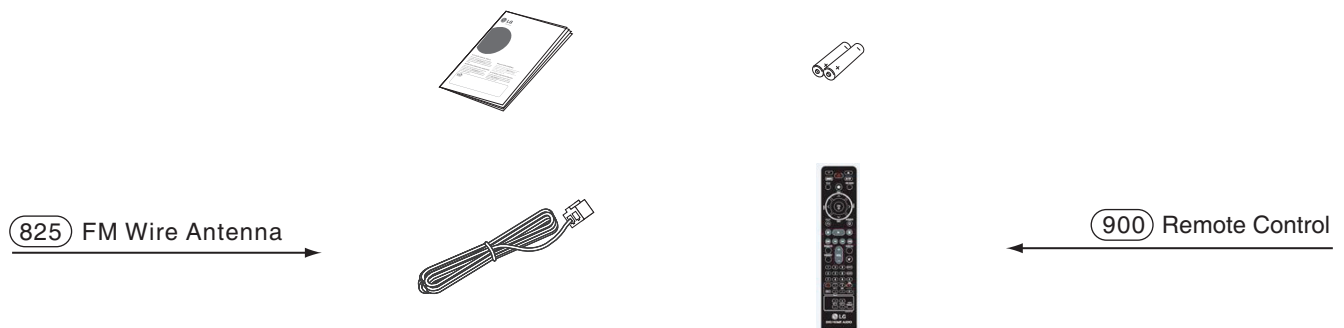


# MEMO

### • Cabinet and main frame parts list

| S                      | AL | LOCA. NO. | PART NO.    | DESCRIPTION          | SPECIFICATION                  | REMARKS |
|------------------------|----|-----------|-------------|----------------------|--------------------------------|---------|
| ASSEMBLY PARTS SECTION |    |           |             |                      |                                |         |
|                        |    | A00       | EAZ62861383 | Deck Assembly        | DECK/MECHA DM20CZ MD sub assy  |         |
|                        |    | A46       | EBR87223401 | PCB Assembly         | OL45 MAIN PCB Ass'y -          |         |
|                        |    | A47       | EBR88047601 | PCB Assembly,Power   | OL45D World Wide / Standard SM |         |
|                        |    | A49       | EBR87056201 | PCB Assembly         | OL45 /OL45D VFD&KEY PCB ASSY - |         |
|                        |    | A50       | EBR87056501 | PCB Assembly         | OL45 /OL45D KEY PCB ASSY -     |         |
|                        |    | A52       | EBR87036607 | PCB Assembly         | OL45 IR_RMC PCB Ass'y -        |         |
|                        |    | A53       | EAT62833604 | Module,Bluetooth     | MB8811C1TN CSR8811 Argentina H |         |
|                        |    | A60       | TCG37368905 | Speaker System Total | OL45-FB.DRUSLLK SVC P/no. ASSY |         |
| PARTS SECTION          |    |           |             |                      |                                |         |
|                        |    | 250       | MCK70391701 | Cover                | MOLD ABS HOME OL45 MOLD COVER  |         |
|                        |    | 261       | MCQ68386801 | Damper               | CUTTING BUTHYL 30 DECK/MECHA D |         |
|                        |    | 261       | MCQ68386801 | Damper               | CUTTING BUTHYL 30 DECK/MECHA D |         |
|                        |    | 262       | MEG64884202 | Holder               | MOLD ABS HOME OM4560 MOLD EF37 |         |
|                        |    | 263       | MEG64941002 | Holder               | MOLD ABS HOME OM4560 MOLD EF37 |         |
|                        |    | 284       | 4970R-0146M | Spring               | EXTRUSION STS 301 PLATE OM4560 |         |
|                        |    | 285       | MCR67586752 | Decor                | MOLD ABS OL45 MOLD DOOR (NO DV |         |
| △                      |    | 300       | EAD62501538 | Power Cord           | EU250N AT-H2P-1500/250-N-00-BK |         |
|                        |    | 521       | 353-100AAAD | Screw,Customized     | 353100AAAC BWH + 3mM 8mM SWCH1 |         |
| CABLES                 |    |           |             |                      |                                |         |
|                        |    | CABLE1    | EAD63325202 | Harness,Single       | HS-LG15-010 12507HS-04L 12507H |         |
|                        |    | CABLE2    | EAD62130058 | Cable,FFC            | AT10010170D02 170MM 1.00MM 10P |         |
|                        |    | CABLE3    | EAD63890802 | Harness,Single       | CAV-18-17 SMH200-03 to SMH200- |         |
|                        |    | CABLE5    | EAD63729601 | Harness,Single       | HS-LG15-012 12005H00-08PL 1200 |         |
|                        |    | CABLE6    | EAD62038008 | Cable,FFC            | TBD_17P125C-H2-1F01A-N-90-0-0- |         |
|                        |    | CABLE7    | EAD63947206 | Harness,Single       | CAV-18-35 SMH200-04 to SMH200- |         |
|                        |    | CABLE8    | EAD63947202 | Harness,Single       | HS-LG16-024 12005H00-04PL-K 12 |         |

## 2. PACKING ACCESSORY SECTION



• **Packing accessory parts list**

| S | AL | LOCA. NO. | PART NO.    | DESCRIPTION                | SPECIFICATION                 | REMARKS |
|---|----|-----------|-------------|----------------------------|-------------------------------|---------|
|   |    | 825       | EAA56671906 | Antenna,T                  | SN150184 SINGLE 0DB 0OHM 0 2M |         |
|   |    | 900       | AKB74955363 | Remote Controller Assembly | MA2 CL9/8/6, OL10/5/4, CK9/5, |         |

# SECTION 3

## ELECTRICAL

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# ONE POINT REPAIR GUIDE

## 1. NO POWER

If the unit doesn't work by no power problem, repair the set according to the following guide.

### 1-1. FUSE & BRIDGE DIODE

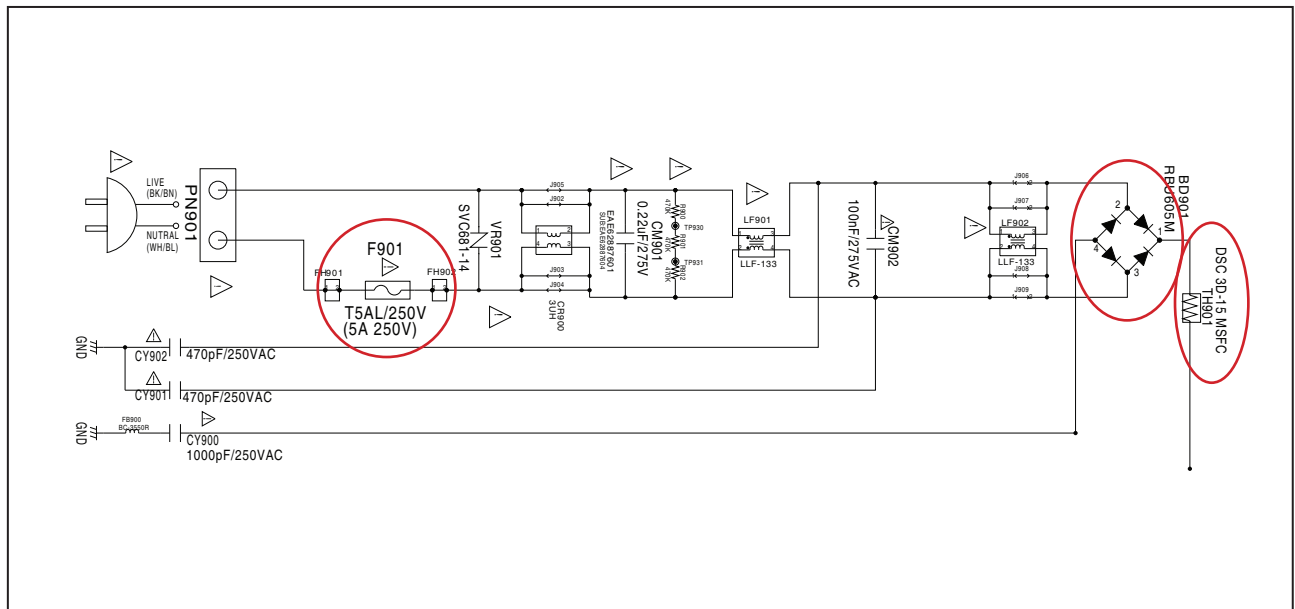
#### 1-1-1. Solution

Please check and replace SMPS board.

#### 1-1-2. How to troubleshoot (Countermeasure)

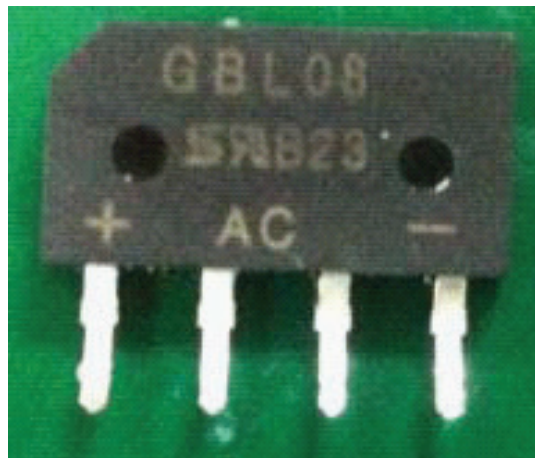
- 1) Check if the fuse F901 is open or short-circuit.
- 2) Check if the bridge diode BD901 is short-circuit by over current with a digital multi-meter.
- 3) Check if the NTC thermistor TH901 is normal or open.

#### 1-1-3. Service hint (Any picture/ Remark)



< F901 >

If F901 is not short-circuit, replace it with a same specifications one.



< BD901 >

BD901 is short-circuit.



< TH901 >

TH901 is open.

# ONE POINT REPAIR GUIDE

## NO POWER

If the unit doesn't work by no power problem, repair the set according to the following guide.

### 1-2. D951

#### 1-2-1. Solution

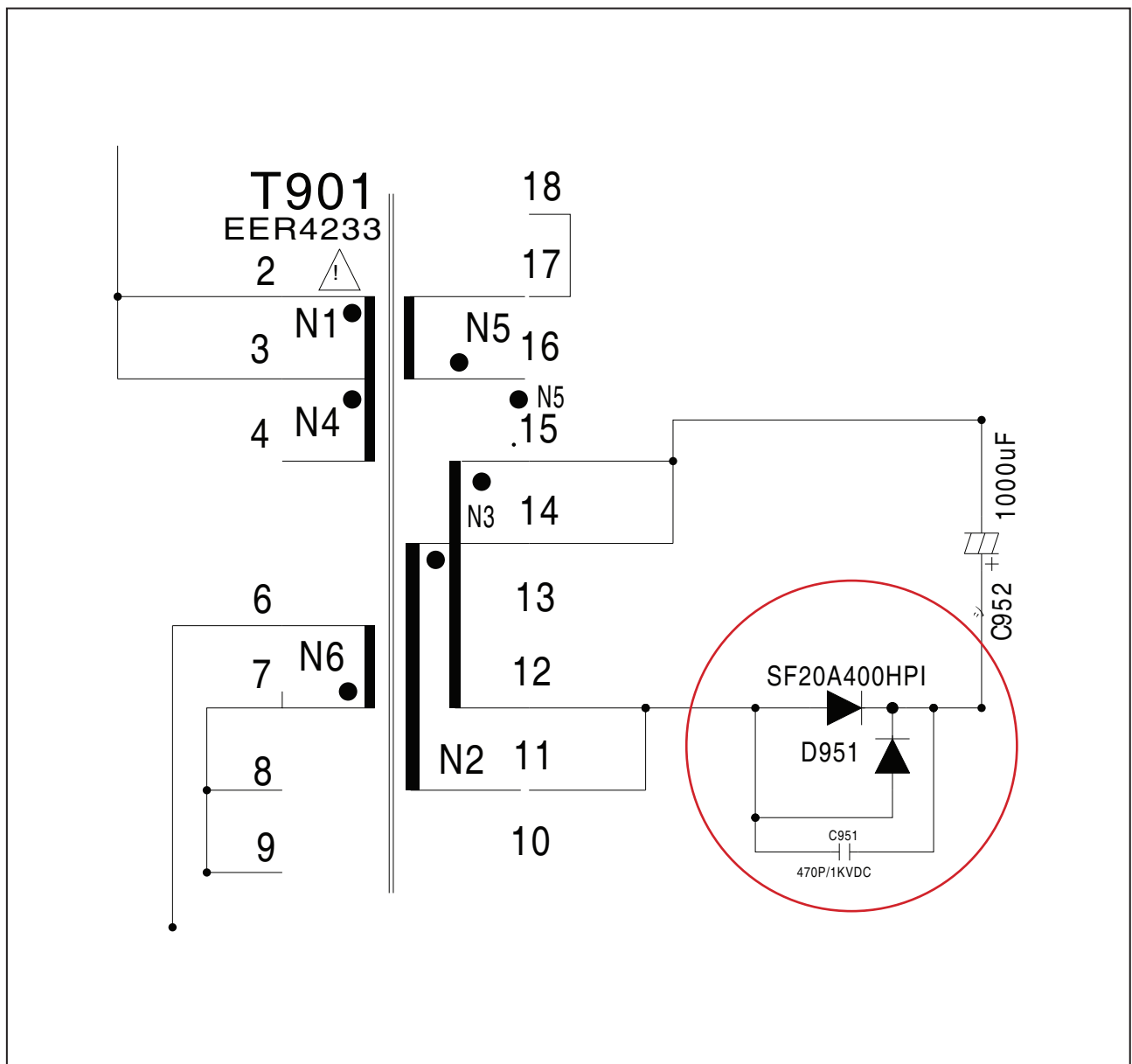
Please check and replace SMPS board.

#### 1-2-2. How to troubleshoot (Countermeasure)

1) Check the anode-cathode voltage of D951 with a digital multi-meter, it is normally 0.2 ~ 0.3 V.

⇒ If it doesn't have any voltage, it's destroyed. Replace it with a new board.

#### 1-2-3. Service hint (Any picture/ Remark)



< SMPS schematic diagram >

# ONE POINT REPAIR GUIDE

## 2. VFD IS NOT DISPLAYED WHEN POWER ON THE SET

When power on the set, any icons or characters on VFD are not displayed.

### 2-1. VFD

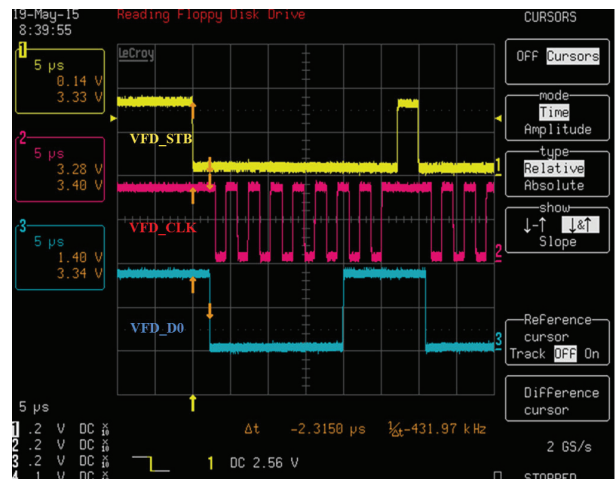
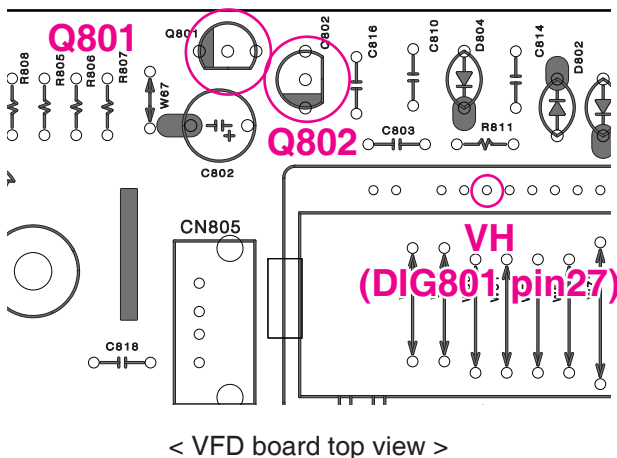
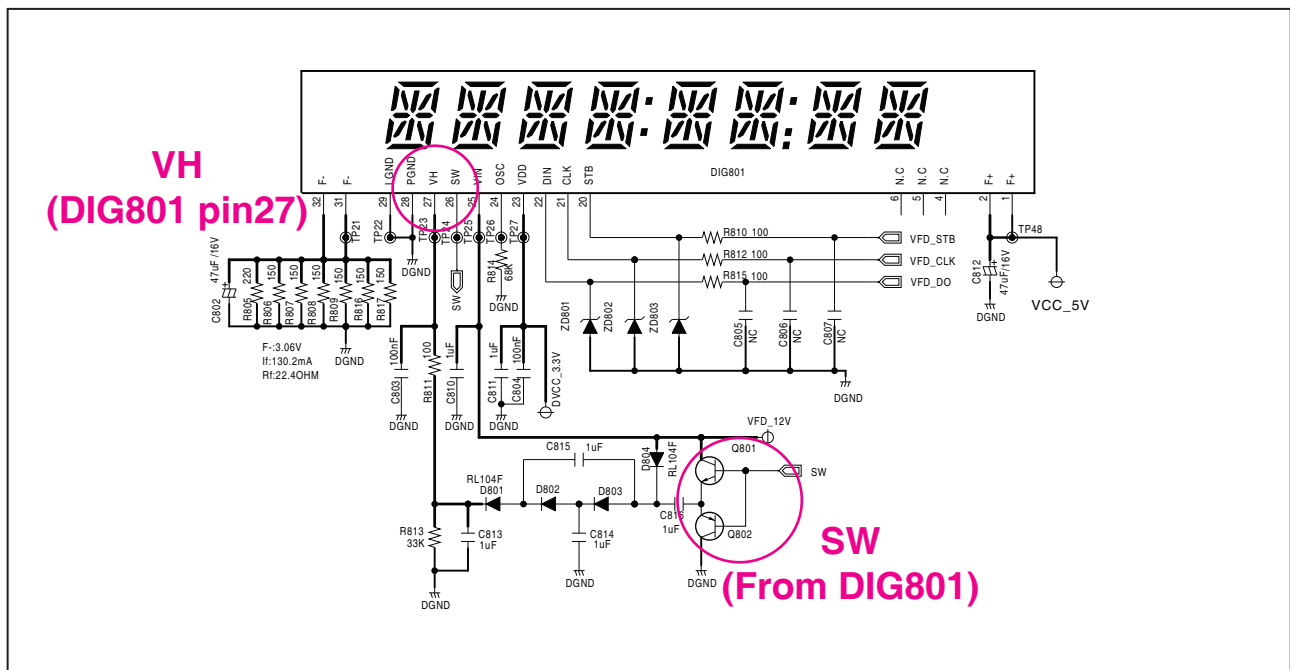
#### 2-1-1. Solution

Please check and replace VFD board.

#### 2-1-2. How to troubleshoot (Countermeasure)

- 1) Check if output from the MAIN board via a DC-DC 12VA, DVCC\_5V, VCC\_3.3V.
  - 2) Check if IC501 outputs VFD\_DO, VFD\_CLK and VFD\_STB to the VFD board.
  - 3) Check if DIG801 output SW signal to the VFD board.
  - 4) Check if Q801 and Q802 to the VFD board.
- ⇒ If the VH signal isn't output, replace VFD board.

#### 2-1-3. Service hint (Any picture/ Remark)



# ONE POINT REPAIR GUIDE

## 3. NO BOOTING WHEN POWER ON THE SET

The set doesn't work when press the power button on the top board or the remote control.

### 3-1. IC501

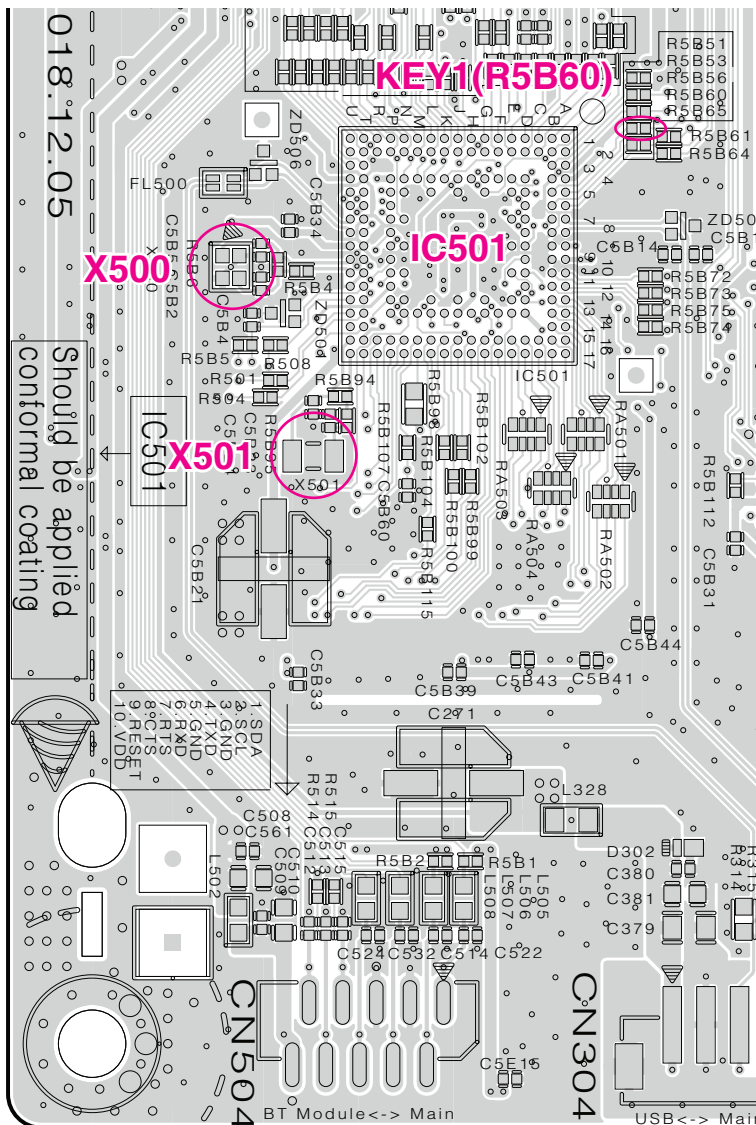
#### 3-1-1. Solution

Please check and replace MAIN board.

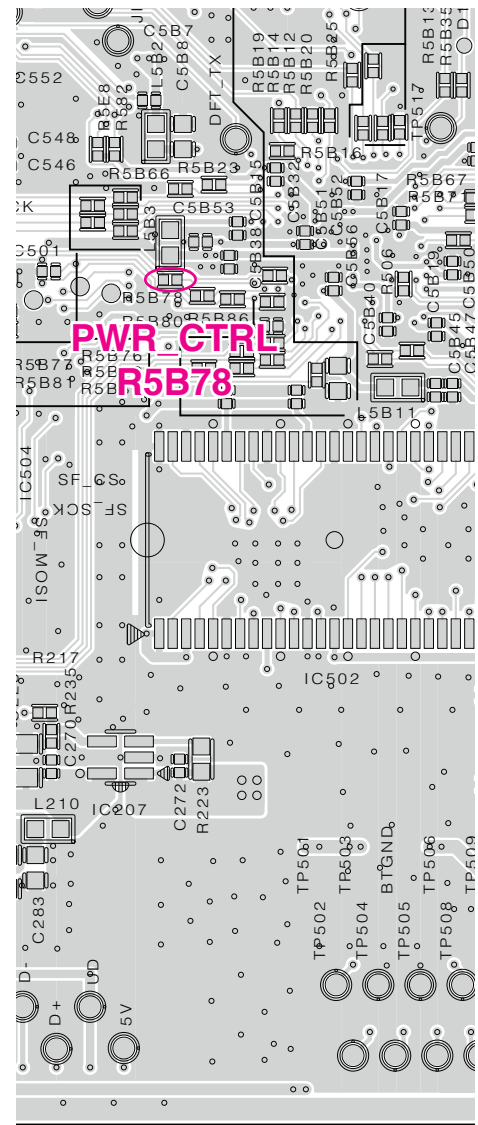
#### 3-1-2. How to troubleshoot (Countermeasure)

- 1) Check the 34 VA (CN201) and 12 VA (IC206) in standby mode.
  - ⇒ If there is no 12 VA, check the IC206 and if doesn't appear 3.3 VA, check IC202.
- 2) Check +12 V, +5.1 VA, 3.3 VA, DVCC\_5V and DVCC\_3.3V when power on the set.
  - ⇒ If the set doesn't work regardless of what the KEY1 changes high to low while pressing the power button. X500 and X501 work normally but, if you can not power on the set, replace MAIN board.

#### 3-1-3. Service hint (Any picture/ Remark)



< Main board top view >





# ONE POINT REPAIR GUIDE

## 4. NO BOOTING (IN CD/USB FUNCTION)

After you turn on power key and displayed message in the following order (HELLO ⇒ VOL XX ⇒ CD or USB) on VFD, it will not display other message on VFD, and it will not boot-up normally.

### 4-1. NO 3.3 VA, 1.2 VA

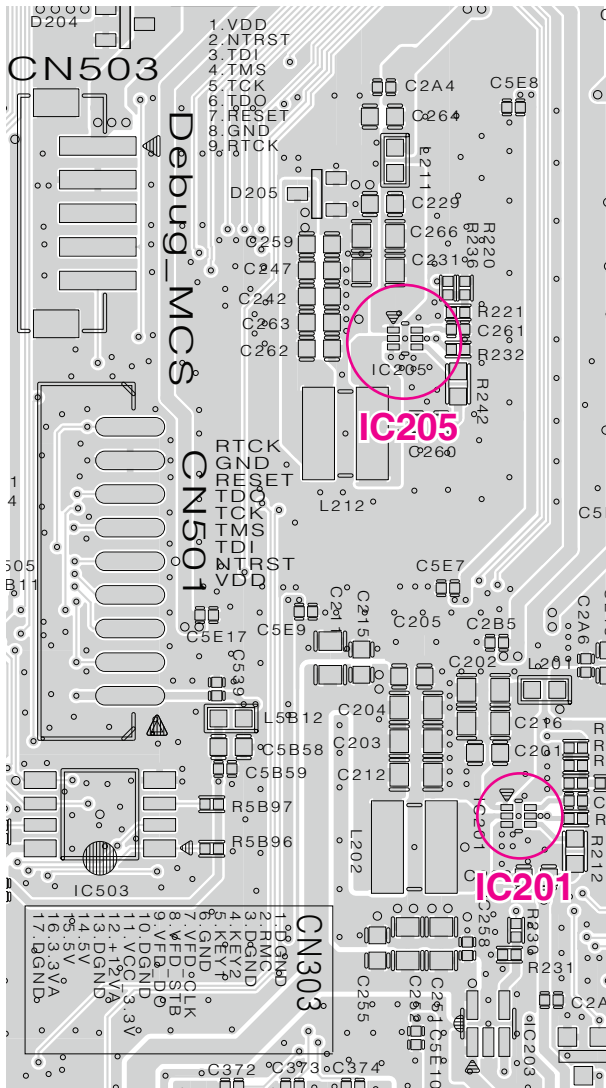
#### 4-1-1. Solution

Please check and replace MAIN board.

#### 4-1-2. How to troubleshoot (Countermeasure)

- 1) Check Voltage of IC202 pin2 on MAIN board.  
⇒ If IC202 pin2 (about 3.3 VA) & pin1 Input +12 V doesn't come out, check IC206 & 34 VA from SMPS board.
- 2) If IC201 pin2 (about 5.1 VA) is normal, check voltage of IC205 pin2 (about 1.2 VA).  
⇒ If there's no defective component then replace MAIN board.
- 3) If PWR\_CTRL is high, check R5B78 and if there's no defective component then replace MAIN board.

#### 4-1-3. Service hint (Any picture/ Remark)



# ONE POINT REPAIR GUIDE

## NO BOOTING (IN CD/USB FUNCTION)

After you turn on power key and displayed message in the following order (HELLO ⇒ VOL XX ⇒ CD or USB) on VFD, it will not display other message on VFD, and it will not boot-up normally.

### 4-2. CRYSTAL (X500)

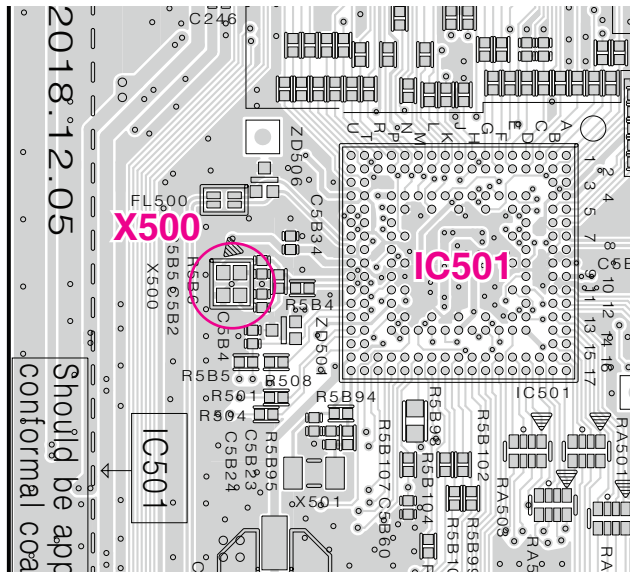
#### 4-2-1. Solution

Replace MAIN board.

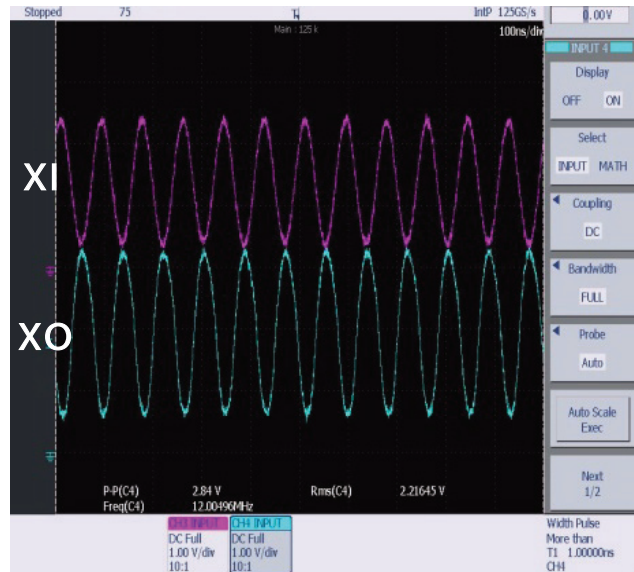
#### 4-2-2. How to troubleshoot (Countermeasure)

- 1) If 3.3 VA & 1.2 VA is normal, check reset 'High' of IC501 pin T12 on MAIN board.  
⇒ If MAIN\_RESET isn't high, check MICOM (ICD104) pin40.
- 2) If MAIN\_RESET is high, check the soldering status of 24 MHz crystal (X500).
- 3) If the crystal (X500) doesn't oscillate, check R5B4, R5B6, C5B2, C5B5 around crystal (X500).  
⇒ If there's no defective component, then replace MAIN board.

#### 4-2-3. Service hint (Any picture/ Remark)



< MAIN board top view >



X500

< Signal waveform >

# ONE POINT REPAIR GUIDE

## NO BOOTING (IN CD/USB FUNCTION)

After you turn on power key and displayed message in the following order (HELLO ⇒ VOL XX ⇒ CD or USB) on VFD, it will not display other message on VFD, and it will not boot-up normally.

### 4-3. SERIAL FLASH (IC503)

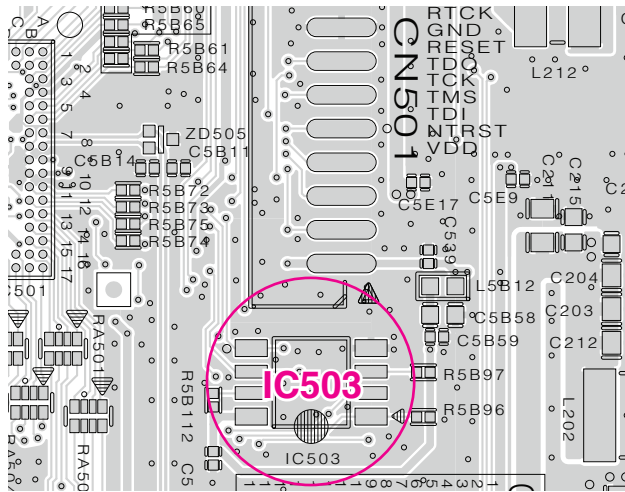
#### 4-3-1. Solution

Please check and replace MAIN board.

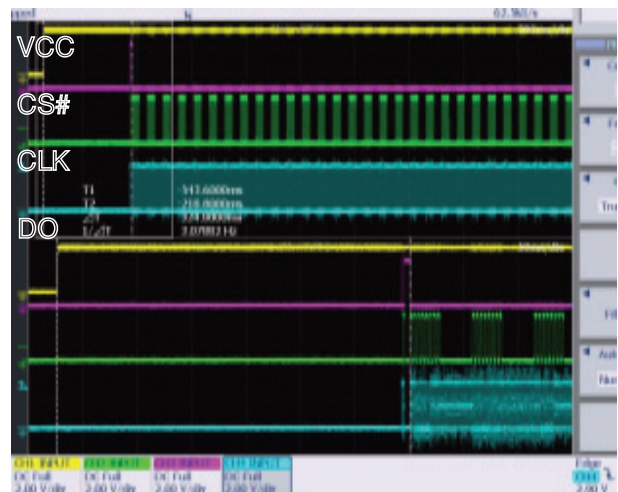
#### 4-3-2. How to troubleshoot (Countermeasure)

- 1) If the crystal (X500) does oscillate, check serial flash (IC503) on MAIN board.  
⇒ Check pin8 (VCC), pin6 (CLK), pin1 (CS), pin2 (MISO), pin5 (MOSI) of below waveform.
- 2) If pin1, 2, 5, 6 doesn't come out, check registers (R5B72 ~ 5) of IC503.  
⇒ If registers of IC503 is OK, then replace IC503. (it need to download program.)

#### 4-3-3. Service hint (Any picture/ Remark)



< MAIN board top view >



< Signal waveform >

## ONE POINT REPAIR GUIDE

## 5. NO OPERATION OF MD

**When no sound output in the CD function, you can not listen to music reading data from a CD disc if the servo motors in MD don't work. This step is for checking the SPINDLE MOTOR among them.**

## 5-1. SPINDLE MOTOR

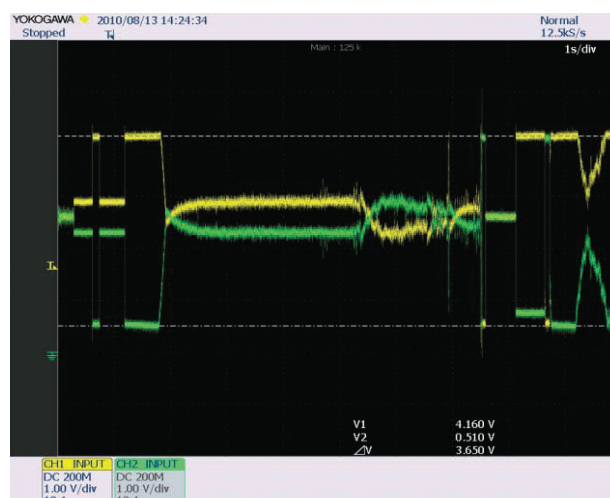
### 5-1-1. Solution

Please check and replace MAIN board or MD.

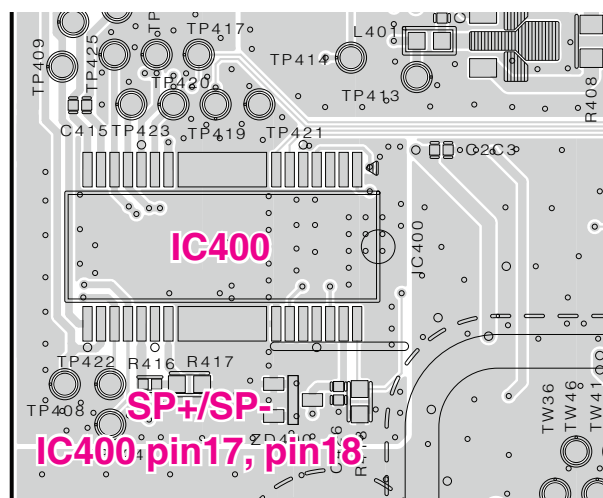
### 5-1-2. How to troubleshoot (Countermeasure)

- 1) Check the SPDO signal from pin16 of IC400  
⇒ If no signal, check DVCC\_3.3V and X400.
- 2) Check the SPIN+ & SPIN- from IC400 to CN401 for driving SPINDLE motor. It is about 3.6 Vp-p.  
⇒ If no signal, check M\_5 V for IC400. And replace MAIN board.
- 3) Check if the FFC cable is solidly connected between CN401 and MD.
- 4) Check the MD.  
⇒ If the spindle motor is short-circuit or has any trouble, it can not rotate CD discs.  
Please check the function after changing another MD.

**5-1-3. Service hint (Any picture/ Remark)**



< Waveform of SP- & SP+  
for driving SPINDLE motor >



< MAIN board bottom view >

# ONE POINT REPAIR GUIDE

## NO OPERATION OF MD

When no sound output in the CD function, you can not listen to music reading data from a CD disc if the servo motors in MD don't work. This step is for checking the SLED MOTOR among them.

### 5-2. SLED MOTOR

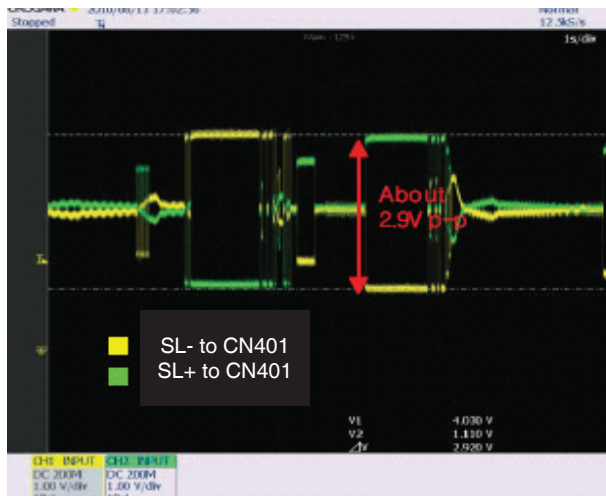
#### 5-2-1. Solution

Please check and replace MAIN board or MD.

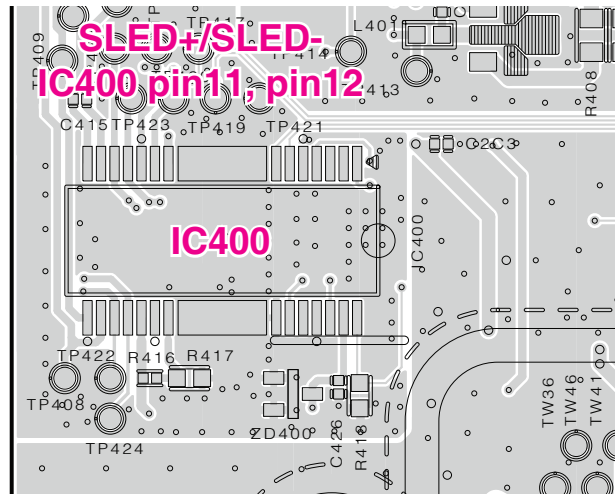
#### 5-2-2. How to troubleshoot (Countermeasure)

- 1) Check the SLDO signal from pin15 of IC400  
⇒ If no signal, check DVCC\_3.3V and X400.
- 2) Check the SPED+ & SLED- from IC400 to CN401 for driving SPINDLE motor. It is about 2.9 Vp-p.  
⇒ If no signal, check M\_5 V for IC400. And replace MAIN board.
- 3) ) Check if the FFC cable is solidly connected between CN401 and MD.
- 4) ) Check the MD.  
⇒ If the spindle motor is sort-circuit or has any trouble, it can not rotate CD discs.  
Please check the function after changing another MD.

#### 5-2-3. Service hint (Any picture/ Remark)



< Waveform of SLED- & SLED+  
for driving SLED motor >



< MAIN board bottom view >



# ONE POINT REPAIR GUIDE

## NO OPERATION OF MD

When no sound output in the CD function, you can not listen to music reading data from a CD disc if the servo motors in MD don't work. This step is for checking the TRAY OPEN/CLOSE MOTOR among them.

### 5-3. TRAY OPEN/CLOSE MOTOR

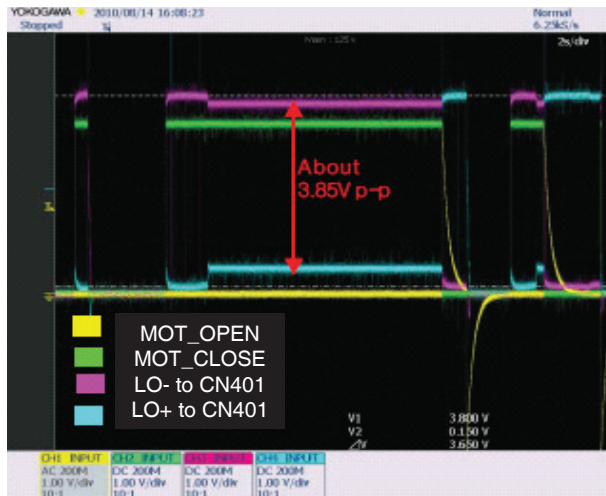
#### 5-3-1. Solution

Please check and replace MAIN board or MD.

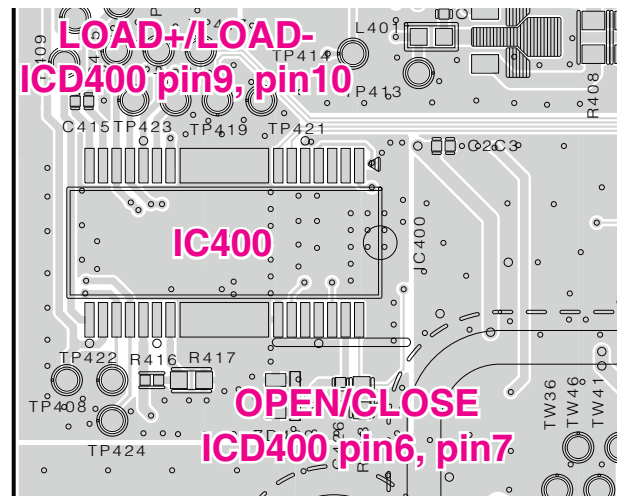
#### 5-3-2. How to troubleshoot (Countermeasure)

- 1) Check MOT\_OPEN & MOT\_CLOSE signals from pin P5, L4 of IC501 to IC400.  
⇒ If no signal, check M\_5V to IC400.
- 2) Check LOAD± from IC400 to CN401 for driving the tray open / close motor. It is about 3.85 Vp-p  
⇒ If no signal, check M\_5V to IC400. If it has any trouble, replace MAIN board.
- 3) Check if the FFC cable is solidly connected between CN401 and MD.
- 4) Check the MD.  
⇒ If the tray motor is short-circuit or has any trouble, it can not open or close the tray.  
Please check the function after changing another MD.

#### 5-3-3. Service hint (Any picture/ Remark)



< Waveform for driving  
TRAY open/close motor >



< MAIN board bottom view >

# ONE POINT REPAIR GUIDE

## NO OPERATION OF MD

When no sound output in the CD function, you can not listen to music reading data from a CD disc if the pickup module in MD doesn't work. This step is for checking the LASER TRACKING ACTUATOR.

### 5-4. LASER TRACKING ACTUATOR

#### 5-4-1. Solution

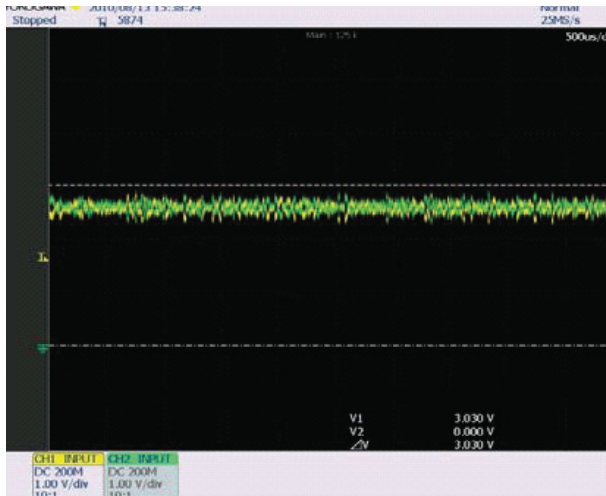
Please check and replace MAIN board.

#### 5-4-2. How to troubleshoot (Countermeasure)

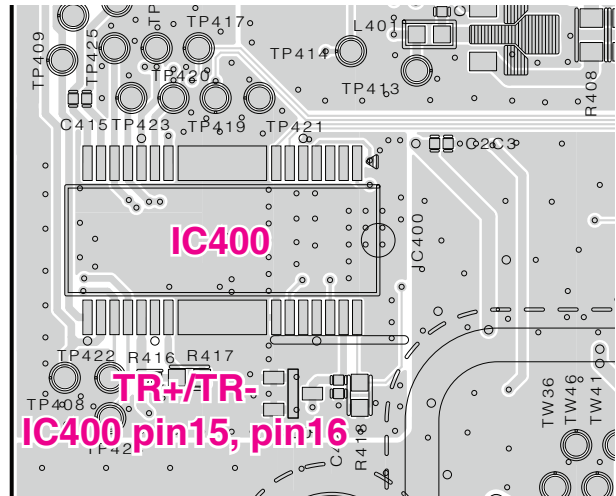
The tracking actuator makes the laser beam be positioned in the center of a track on CD disc.

- 1) Check the TRD signal from pin14 of IC400.  
⇒ If no signal, check DVCC\_3.3V and X400.
- 2) Check TR- & TR+ from IC400 to CN400 for driving the tracking actuator.  
⇒ If no signal, check M\_5V for IC400. And replace MAIN board.
- 3) Check if the FFC cable is solidly connected between CN400 and MD.
- 4) Check the MD.  
⇒ If the pickup module has any trouble, it can not move the laser beam on the left or right side.  
Please check the function after changing another MD.

#### 5-4-3. Service hint (Any picture/ Remark)



< Waveform of TR±  
for driving TRACKING actuator >



< MAIN board bottom view >

# ONE POINT REPAIR GUIDE

## NO OPERATION OF MD

When no sound output in the CD function, you can not listen to music reading data from a CD disc if the pickup module in MD doesn't work. This step is for checking the LASER FOCUSING ACTUATOR.

### 5-5. LASER FOCUSING ACTUATOR

#### 5-5-1. Solution

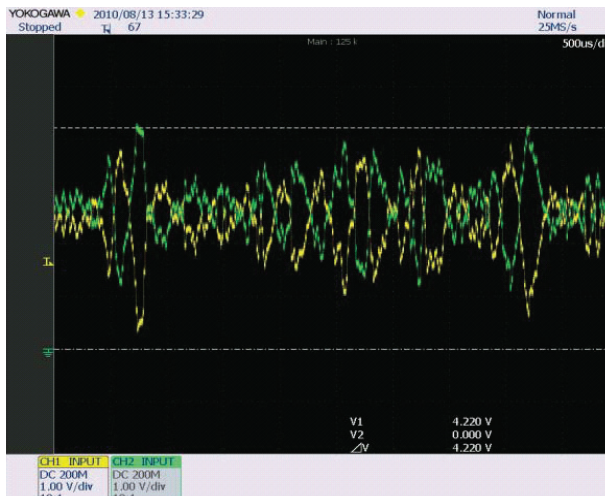
Please check and replace MAIN board or MD.

#### 5-5-2. How to troubleshoot (Countermeasure)

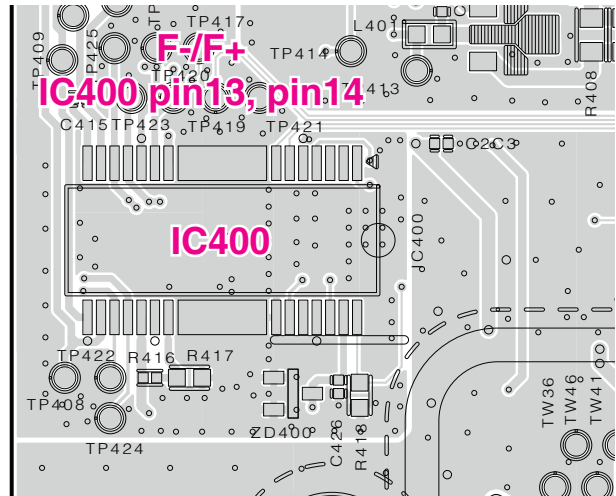
The focusing actuator makes the laser beam keep a regular interval with the surface of a CD disc.

- 1) Check the FDO signal from pin13 of IC400  
⇒ If no signal, check DVCC\_3.3 and X400.
- 2) Check F- & F+ from IC400 to CN400 for driving the focusing actuator. Replace MAIN board.  
⇒ If no signal, check M\_5V for IC400.
- 3) Check if the FFC cable is solidly connected between CN400 and MD.
- 4) Check the MD.  
⇒ If the pickup module has any trouble, it can not move the laser beam on the top or bottom side.  
Please check the function after changing another MD.

#### 5-5-3. Service hint (Any picture/ Remark)



< Waveform of F±  
for driving FOCUSING actuator >



< MAIN board bottom view >



# ONE POINT REPAIR GUIDE

## 6. NO SOUND

There is no sound output in the CD FUNCTION, repair the set according to the following guide.

### 6-1. IN THE CD FUNCTION

#### 6-1-1. Solution

Please check and replace MAIN board.

#### 6-1-2. How to troubleshoot (Countermeasure)

1) Check CD\_BCLK, CD\_LRCK, & CD\_DOUTA signals from IC700 to IC501.

⇒ If no signal, check if the RF & servo signals from MD is entered to IC501.

Refer to the "No operation of MD" guide on Item 5.

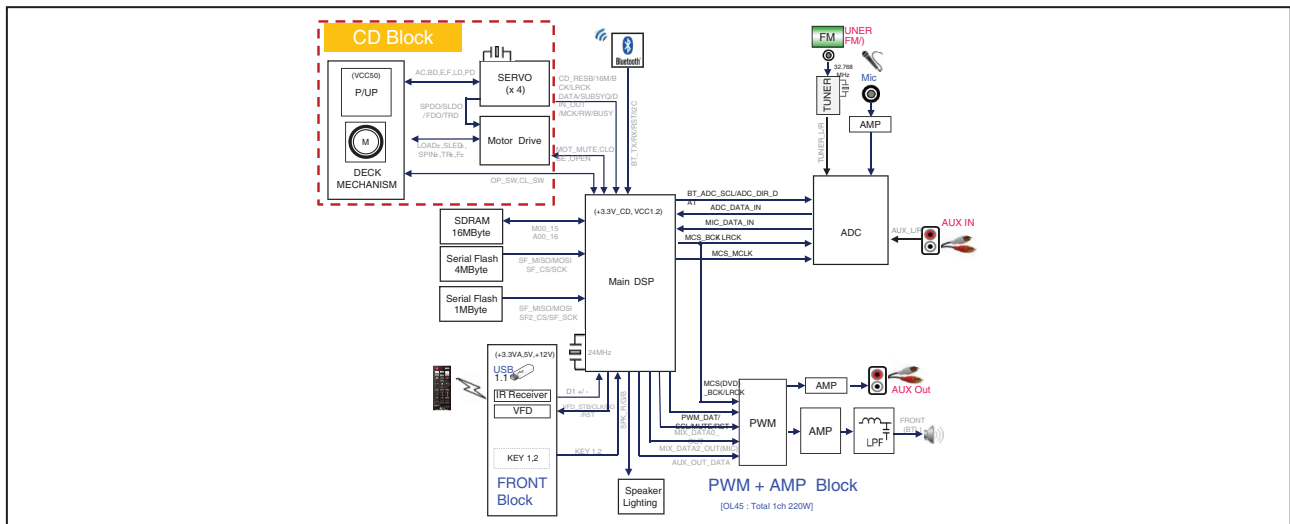
2) Check the following I2S signal flow. < I2S audio signal Interface >

- MCS\_BCK : IC501\_Pin E1 --> IC700\_pin23
- MCS\_LRCK : IC501\_Pin D1 --> IC700\_pin22 (44.1 kHz)
- MCS\_DATA : IC501\_Pin E2 --> IC700\_pin24

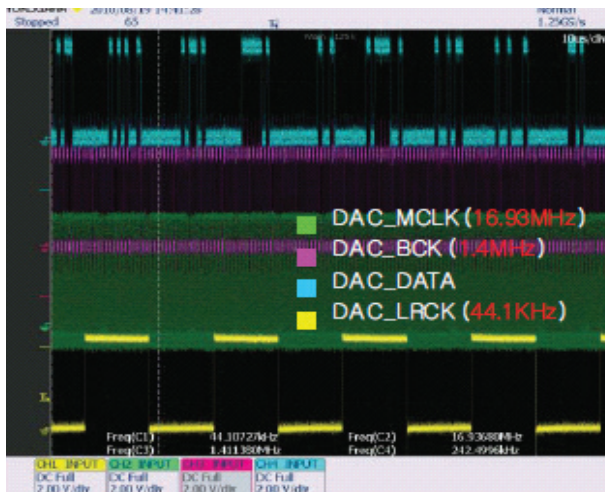
⇒ If there is any trouble, check the power for each IC.

The power is normal but, if the signal waveform to the IC is distorted or no signal, replace MAIN board.

#### 6-1-3. Service hint (Any picture/ Remark)



< I2S Signal Flow >



< Waveform of I2S audio interface signals >

# ONE POINT REPAIR GUIDE

## NO SOUND

There is no sound output by DIGITAL AUDIO AMP DAMAGE, repair the set according to the following guide.

### 6-2. BY DIGITAL AUDIO AMP DAMAGE (IN ALL FUNCTIONS)

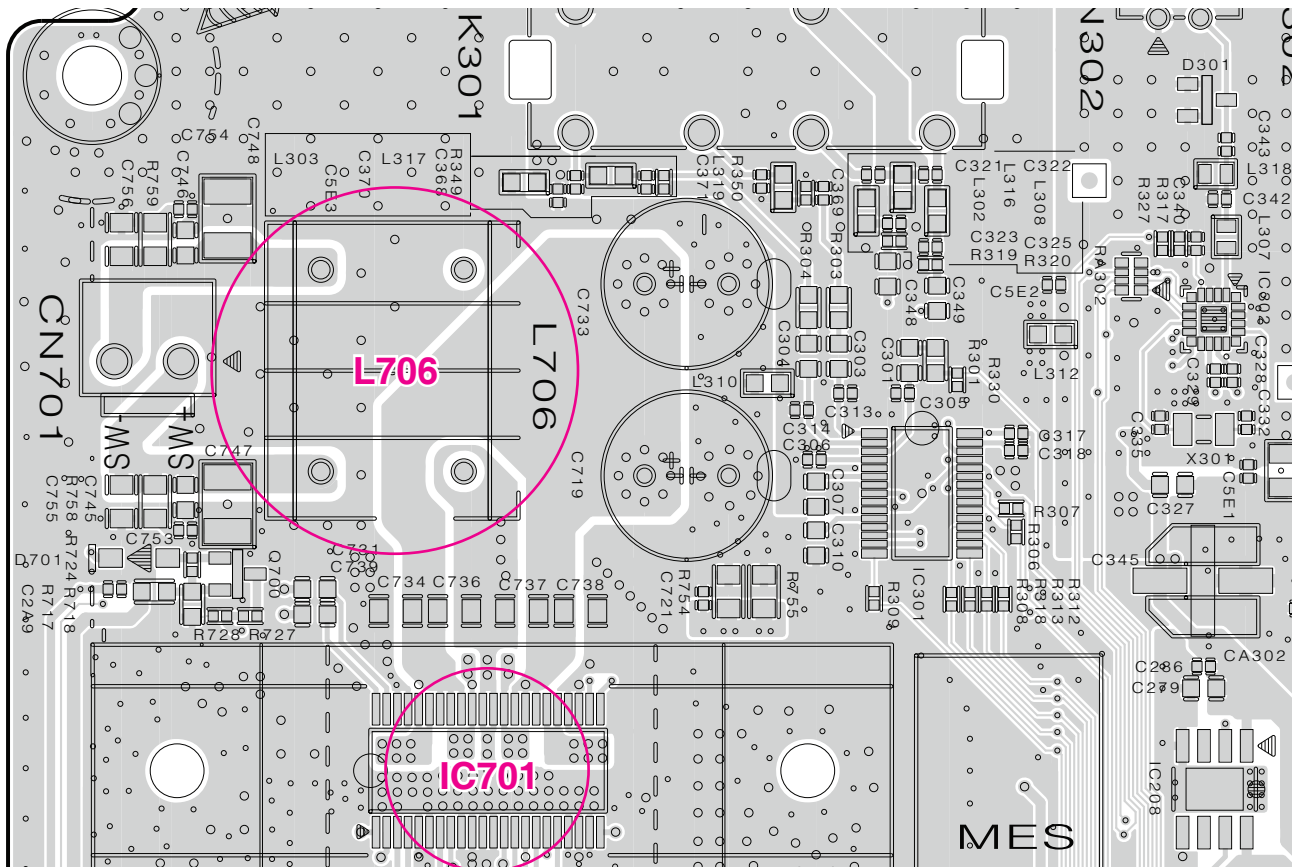
#### 6-2-1. Solution

Please check and replace MAIN board.

#### 6-2-2. How to troubleshoot (Countermeasure)

- 1) Check PWM\_FL±, PWM\_FR± signals from IC700 to IC701 each input function.  
⇒ If no signal, check if I2S audio signals are entered to IC701.  
Refer to "I2S audio signal interface" on Item 6-1.
- 2) Check PVDD.  
⇒ If PVDD is abnormal, check the SMPS.
- 3) Check +12 V for driving the gate of AMP IC(IC700).
  - a. All the powers are normal, but if +12 V is low, there is possible for AMP IC to be damaged.
  - b. Remove L706 one. When removed a inductance, if +12 V is recovered, the IC connected to it was damaged.
- 4) Check the impedance between IC700 OUT\_C/OUT\_D & GND.
  - a. If the impedance is 0 Ω, the IC must be damaged.
  - b. After removing the heatsink, replace MAIN board.

#### 6-2-3. Service hint (Any picture/ Remark)



< MAIN board top view >

# ONE POINT REPAIR GUIDE

## NO SOUND

There is no sound output in the USB FUNCTION, repair the set according to the following guide.

### 6-3. IN THE USB FUNCTION

#### 6-3-1. Solution

Please check and replace MAIN board & FRONT board.

#### 6-3-2. How to troubleshoot (Countermeasure)

1) Check +5V\_USB to FRONT board.

⇒ If an insert, search, or file search on the VFD display USB Device into the USB jack, the voltage is okay, if so not, check +5V to pin4 of CN804.

2) Check USB D± from MAIN board to FRONT board.

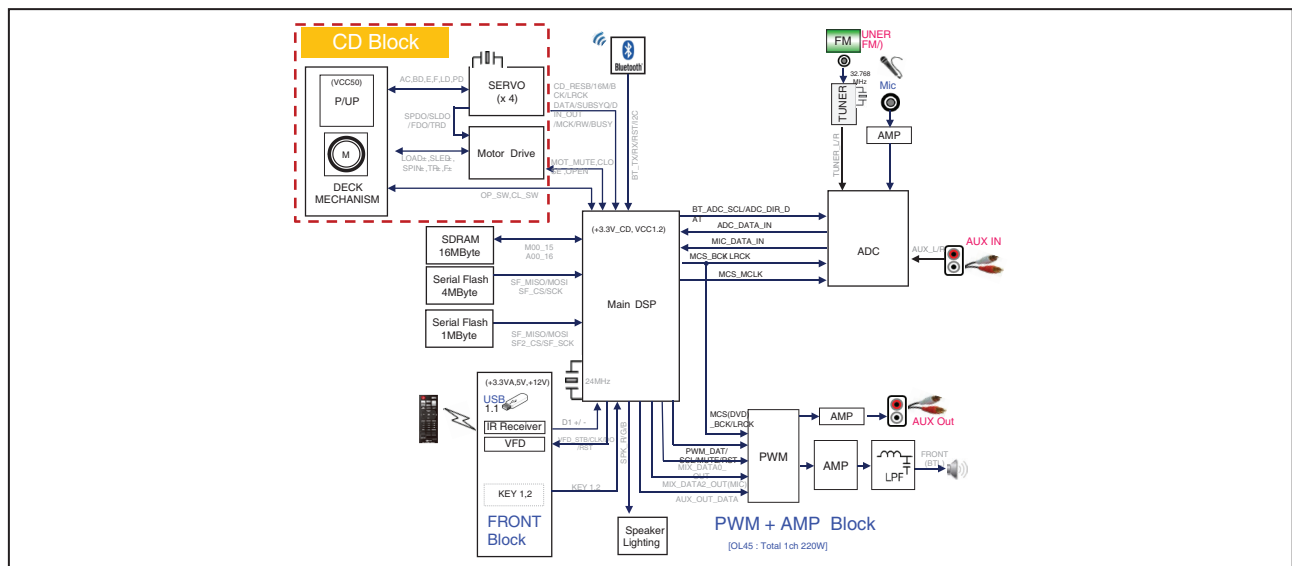
a. Check USB 1.1\_D± signals(pin A7, A8 ) to IC501.

b. Check USB 1.1\_D± signals to CN304 (pin3, 4).

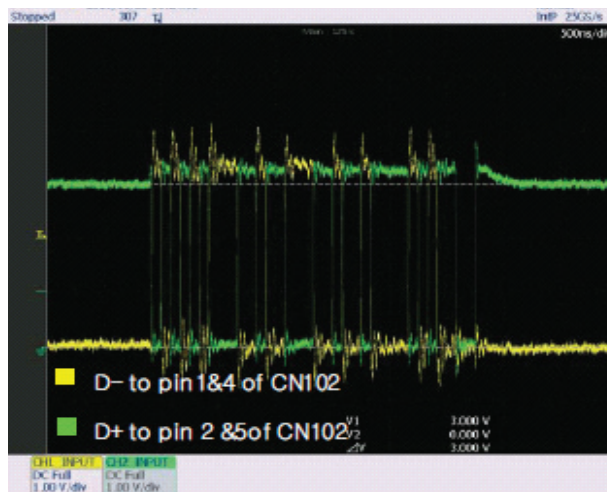
⇒ If there is any trouble, check the power for each IC.

The power is normal but, if the signal waveform to the IC is distorted or no signal, replace MAIN board.

#### 6-3-3. Service hint (Any picture/ Remark)



< USB function signal flow >



< Waveform of USB D± signal >

# ONE POINT REPAIR GUIDE

## NO SOUND

There is no sound output in the AUX FUNCTION, repair the set according to the following guide.

### 6-4. IN THE AUX FUNCTION

#### 6-4-1. Solution

Please check and replace MAIN board.

#### 6-4-2. How to troubleshoot (Countermeasure)

- 1) Check AUX\_L/R signals to IC301 (pin1, 2).
- 2) Check if DSPI\_BCK, DSPI\_LRCK & DSPI\_MCLK are entered from IC501 to IC301.
- 3) Check if ADC\_DIR\_DATA is entered from IC301 to IC501.
  - ⇒ If no signal, check ADC\_3.3V & DVCC\_3.3 V(ADC) for IC301. If is NG, replace MAIN board.
- 4) Check the following I2S signal flow from IC701 to IC700. (Refer to Item 5-1.)
  - ⇒ If there is any trouble, check the power for each IC.

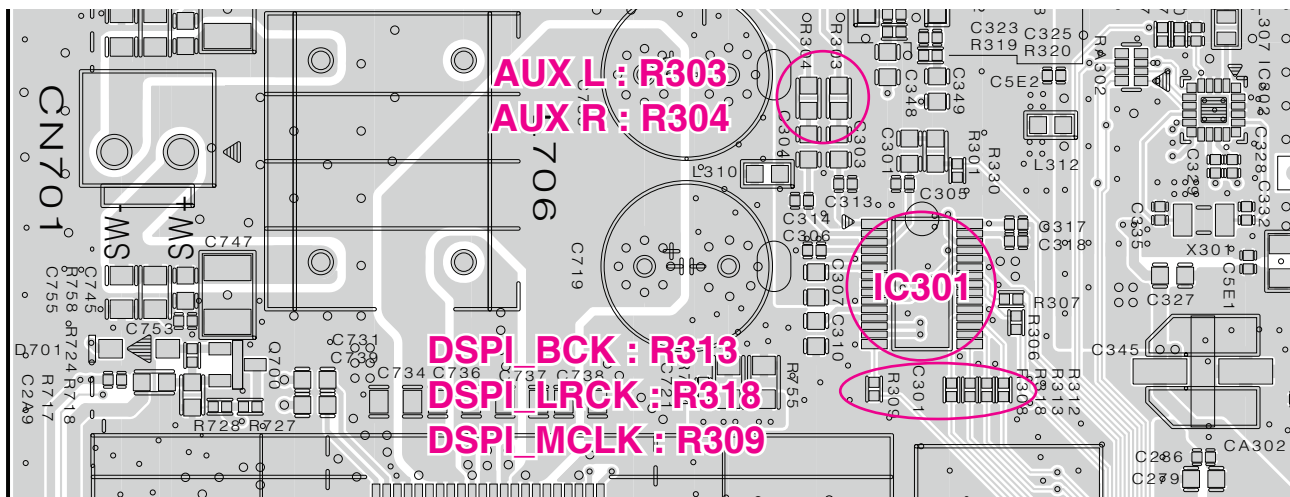
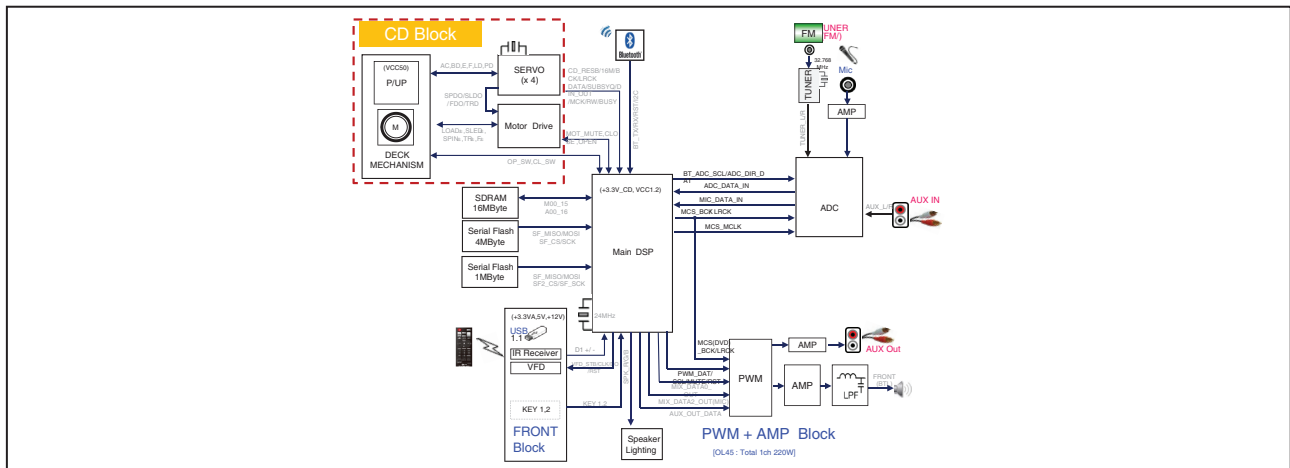
The power is normal but, if the signal waveform to the IC is distorted or no signal, replace MAIN board.

- 5) Check if the digital audio AMP block is okay. Refer to “Digital Audio AMP” guide on Item 6-2.

⇒ If AMP is damaged, replace MAIN board.

#### 6-4-3. Service hint (Any picture/ Remark)

< AUX function signal flow >



< MAIN board top view >

# ONE POINT REPAIR GUIDE

## NO SOUND

There is no sound output in the TUNER FUNCTION, repair the set according to the following guide.

### 6-5. IN THE TUNER FUNCTION

#### 6-5-1. Solution

Please check and replace MAIN board.

#### 6-5-2. How to troubleshoot (Countermeasure)

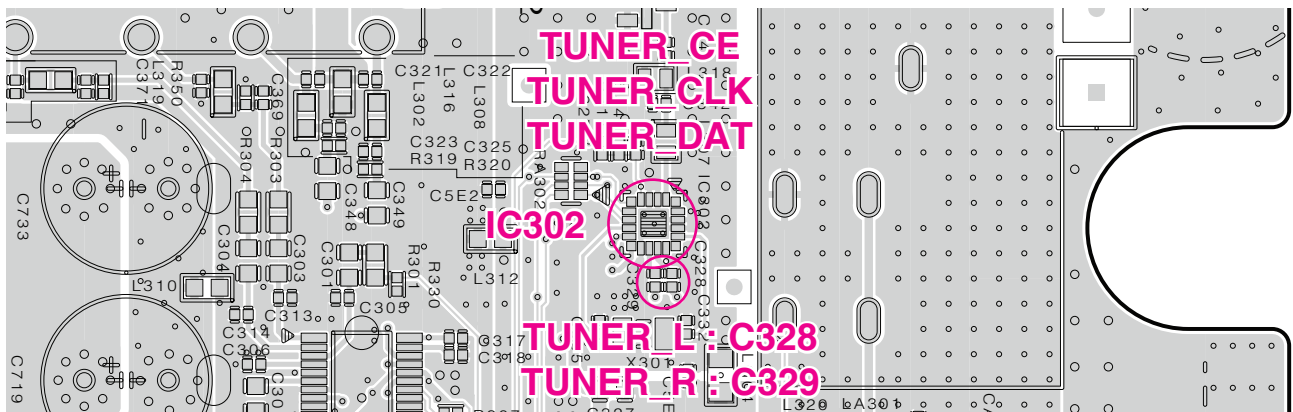
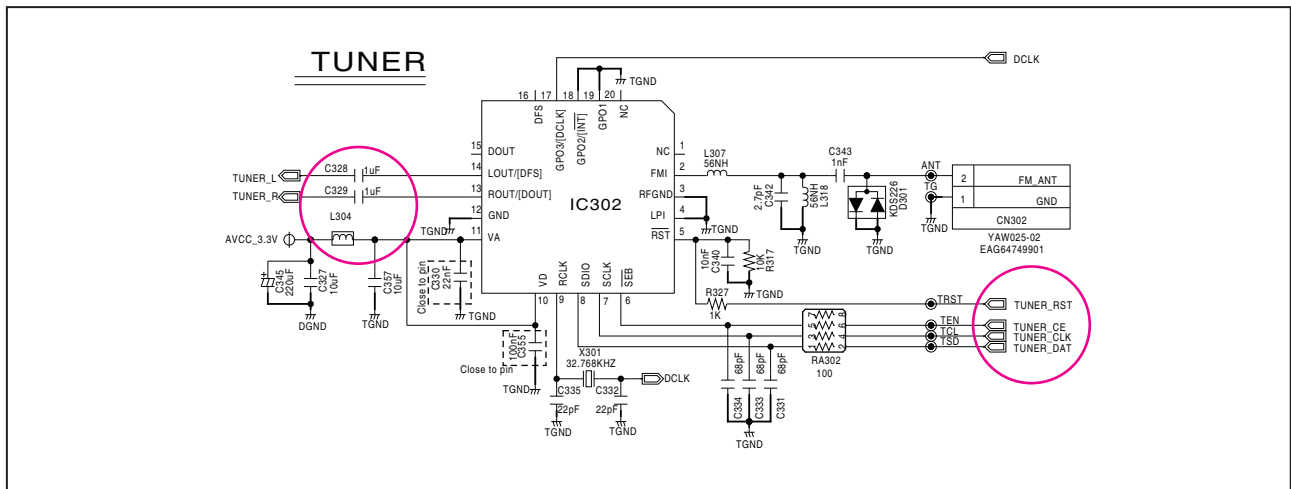
- 1) Check if TUNER\_LR is entered from pin27, 28 of IC301 to IC302(pin13, 14).  
 ⇒ If no signals, check +3.3 V for tuner power.  
 ⇒ Check if the tuner control signals (CLK, DAT, CE, RST, SLT) are entered from IC301 to IC501.
- 2) Check if DSPI\_BCK, DSPI\_LRCK, & DSPI\_MCLK are entered from IC301 to IC501.
- 3) Check if ADC\_DIR\_DATA is entered from IC301 to IC501.  
 ⇒ If no signal, check +5 V & +3.3 V(ADC) for IC301. If is NG, replace MAIN board.
- 4) Check the following I2S audio signal flow from IC501 to IC302. (Refer to Item 6-1.)  
 ⇒ If there is any trouble, check the power for each IC.

The power is normal but, if the signal waveform to the IC is distorted or no signal, replace MAIN board.

- 5) Check if the digital audio AMP block is okay. Refer to “Digital Audio AMP” guide on Item 6-2.

⇒ If AMP is damaged, replace MAIN board.

#### 6-5-3. Service hint (Any picture/ Remark)



< MAIN board top view >



# ONE POINT REPAIR GUIDE

## 7. PROTECTION

### 7-1. D(DC) Protection

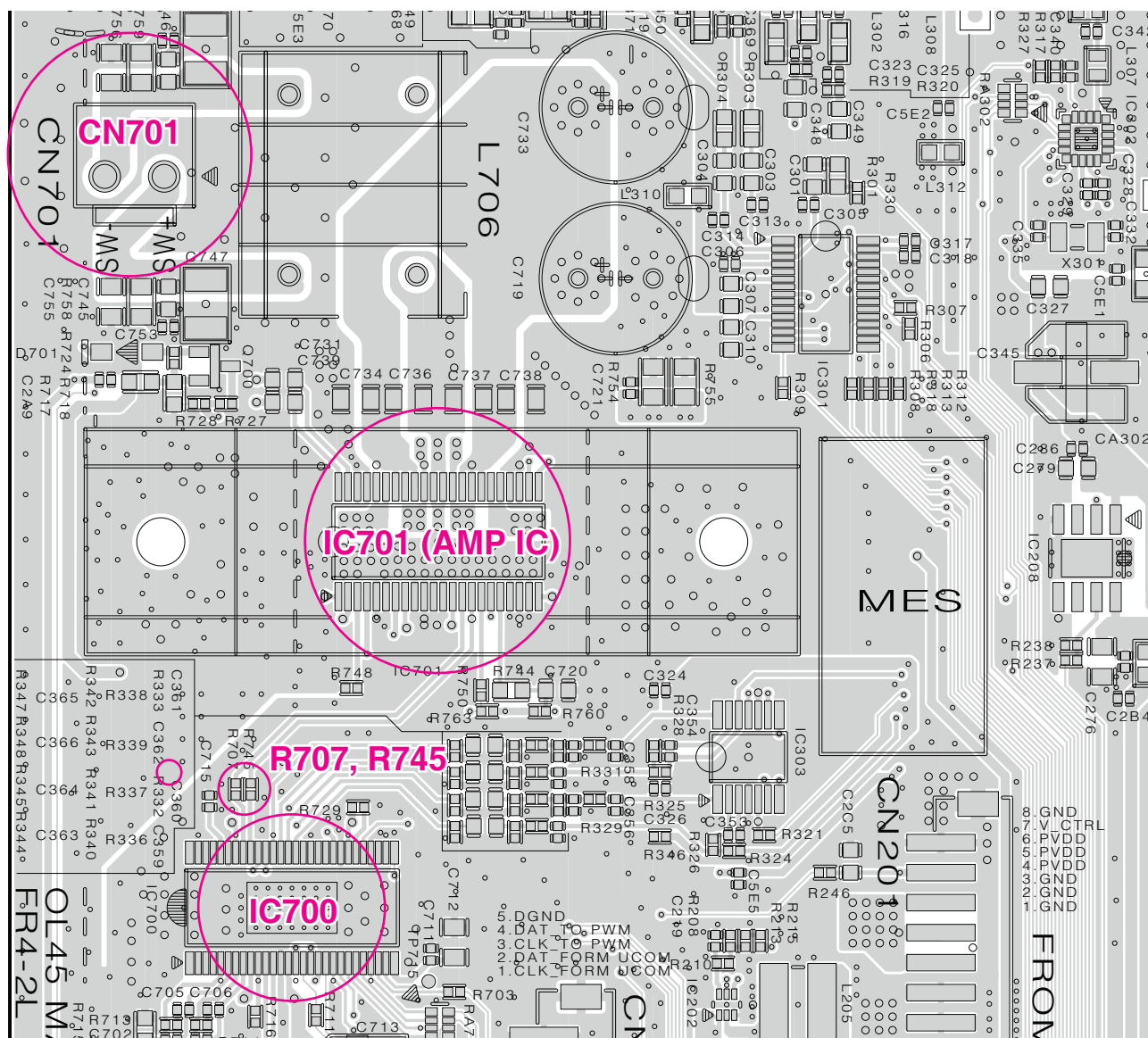
#### 7-1-1. Solution

Replace MAIN board.

#### 7-1-2. How to troubleshoot (Countermeasure)

- 1) After main set power off, check red LED blink at intervals of 1 second. (D Protection or S Protection)
- 2) Turn main set power on again.
- 3) Check DC voltage of speaker out channel + & - (CN701 pin1, 2).
- 4) Check resistor crack, cold solder of PWM IC out (R707, R745).
- 5) If PWM IC out is ok & speaker out (+/-) has DC voltage, replace MAIN board.

#### 7-1-3. Service hint (Any picture/ Remark)



< Main board top view >

# ONE POINT REPAIR GUIDE

## PROTECTION

### 7-2. S(Shut down) Protection

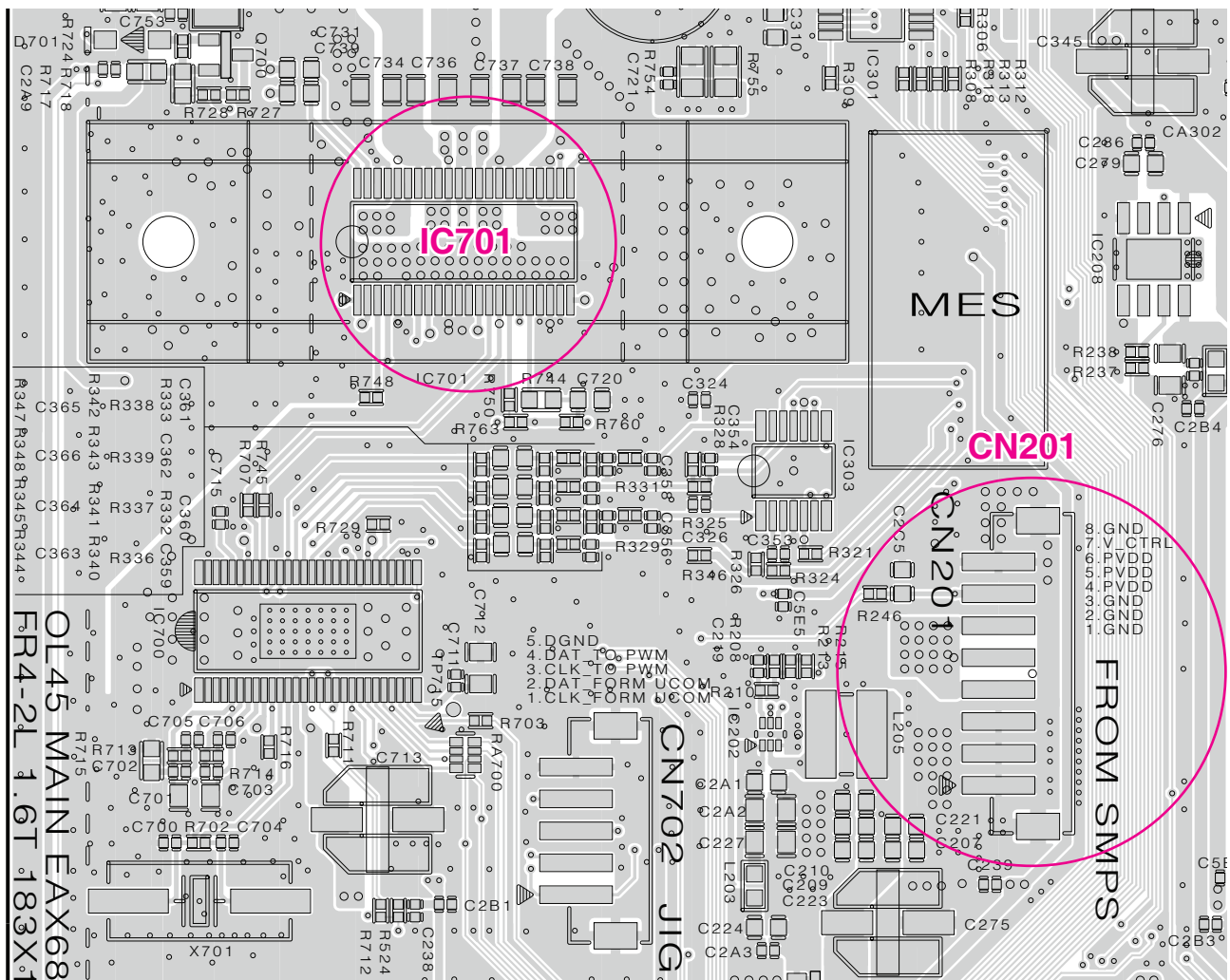
#### 7-2-1. Solution

Replace MAIN board.

#### 7-2-2. How to troubleshoot (Countermeasure)

- 1) After main set power off, check red LED blink at intervals of 1 second. (D Protection or S Protection)
- 2) Turn main set power on again.
- 3) Check PVDD voltage (34 V) of CN201 pin4, 5, 6.
  - If PVDD voltage has 30 V under, refer to SMPS board repair guide.
- 4) Check GVDD, VDD voltage (12 V) of IC701 pin1, 22.
  - If GVDD, VDD voltage has 8.5 V under, refer to 12V no power repair guide.
- 5) Check impedance (3 ohm) of speaker unit.
  - If Impedance of speaker unit has 1 ohm under, replace speaker unit.
- 6) If check point 3, 4, 5 is ok, replace MAIN board.

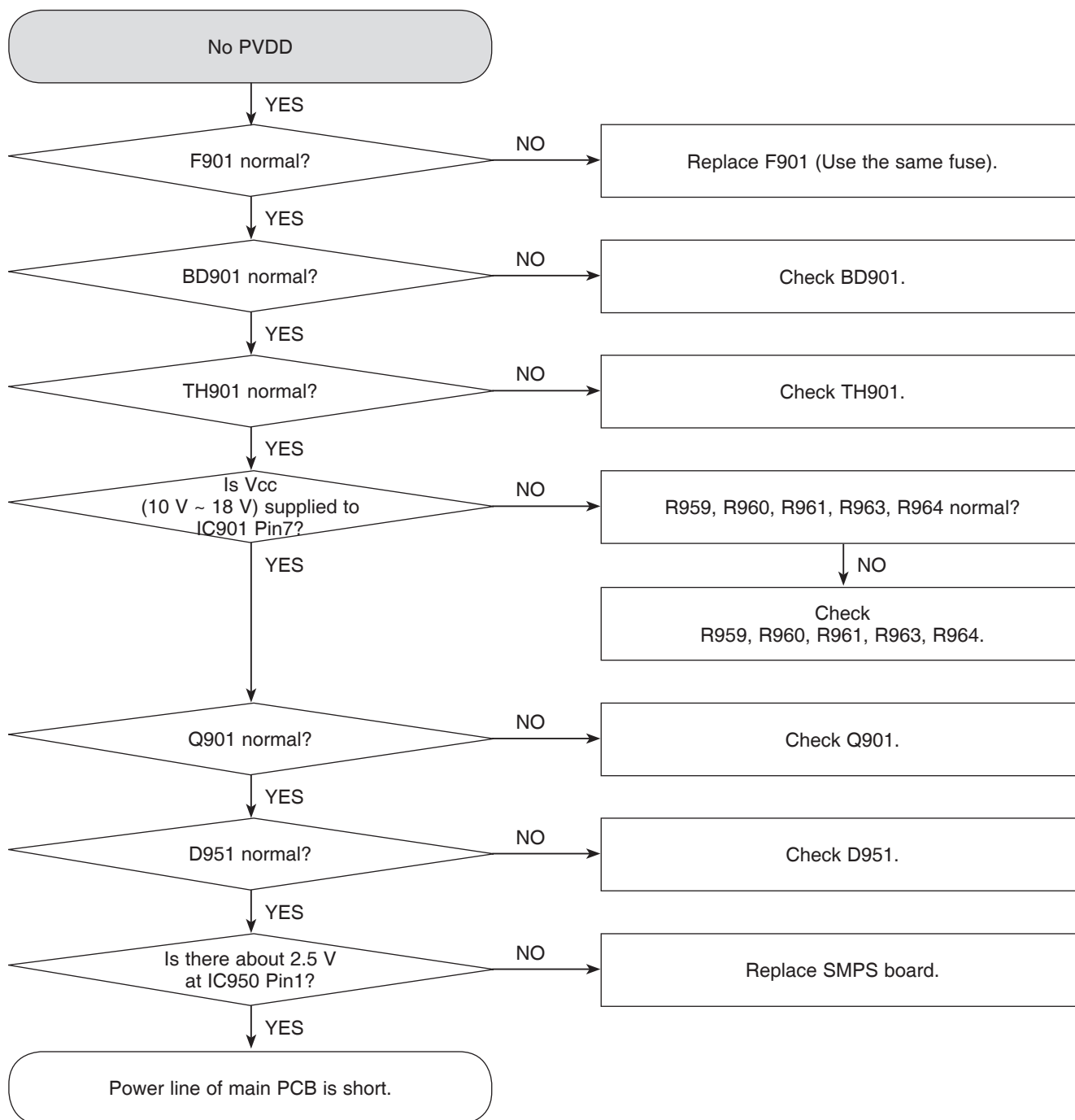
#### 7-2-3. Service hint (Any picture/ Remark)



< Main board top view >

# ELECTRICAL TROUBLESHOOTING GUIDE

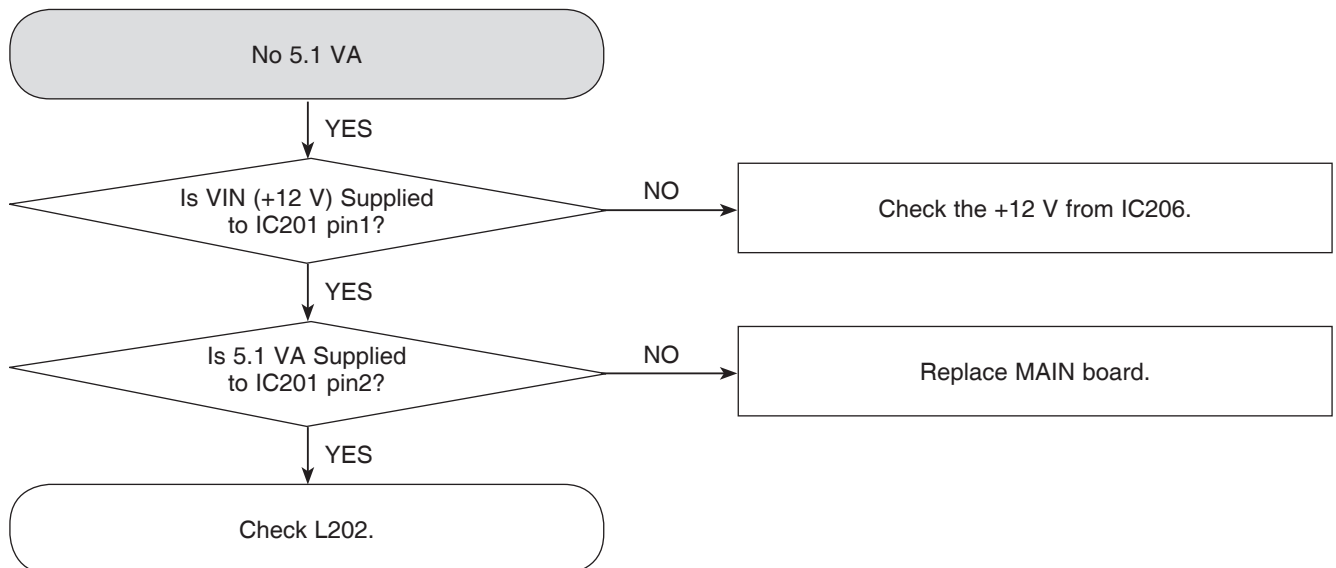
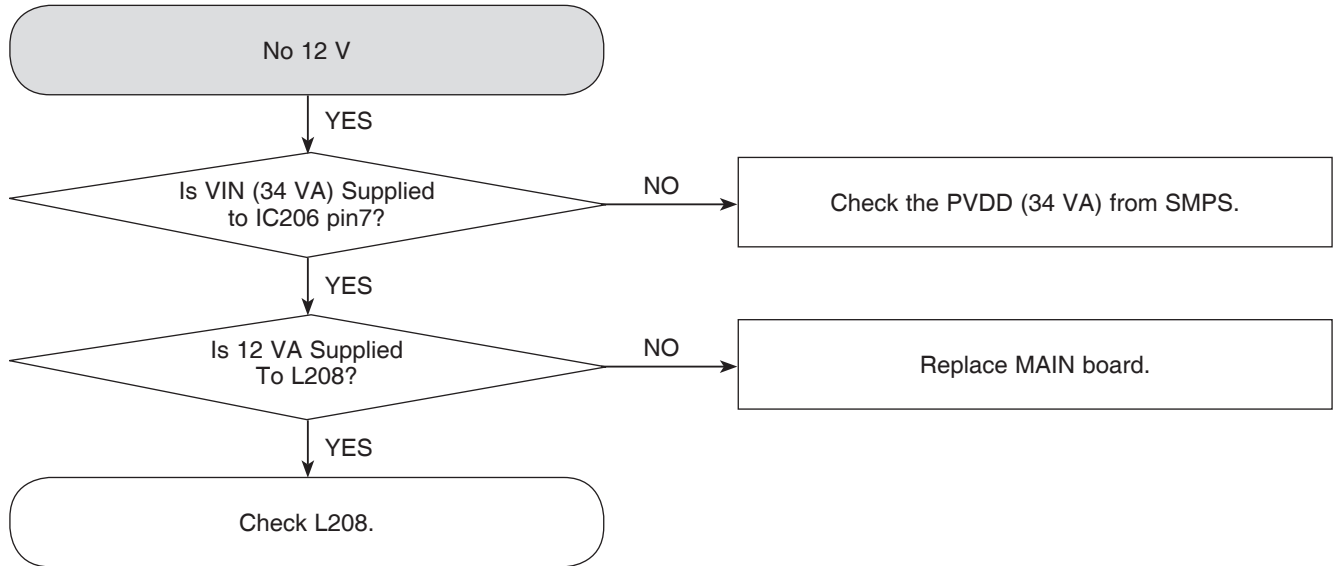
## 1. POWER (SMPS)





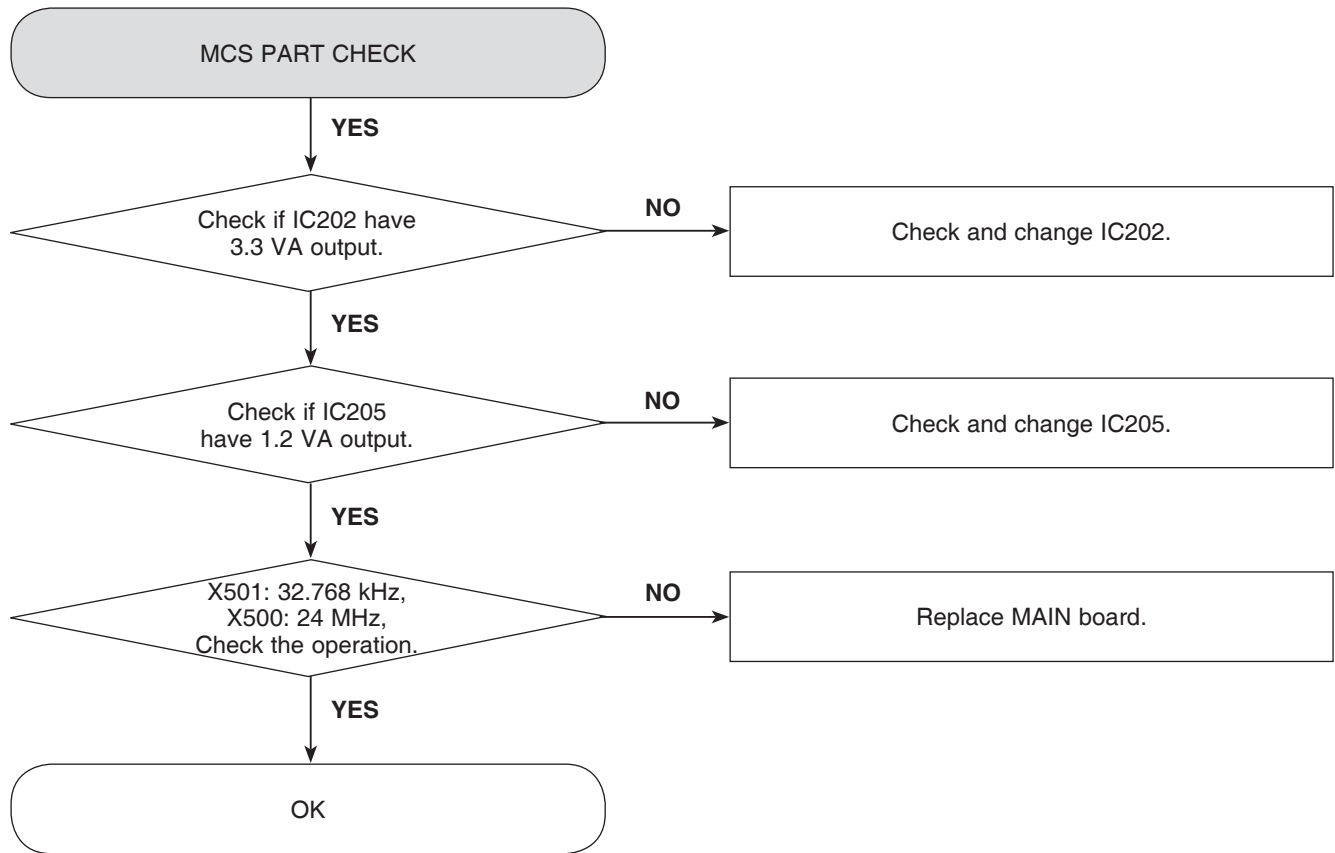
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## POWER (SMPS)

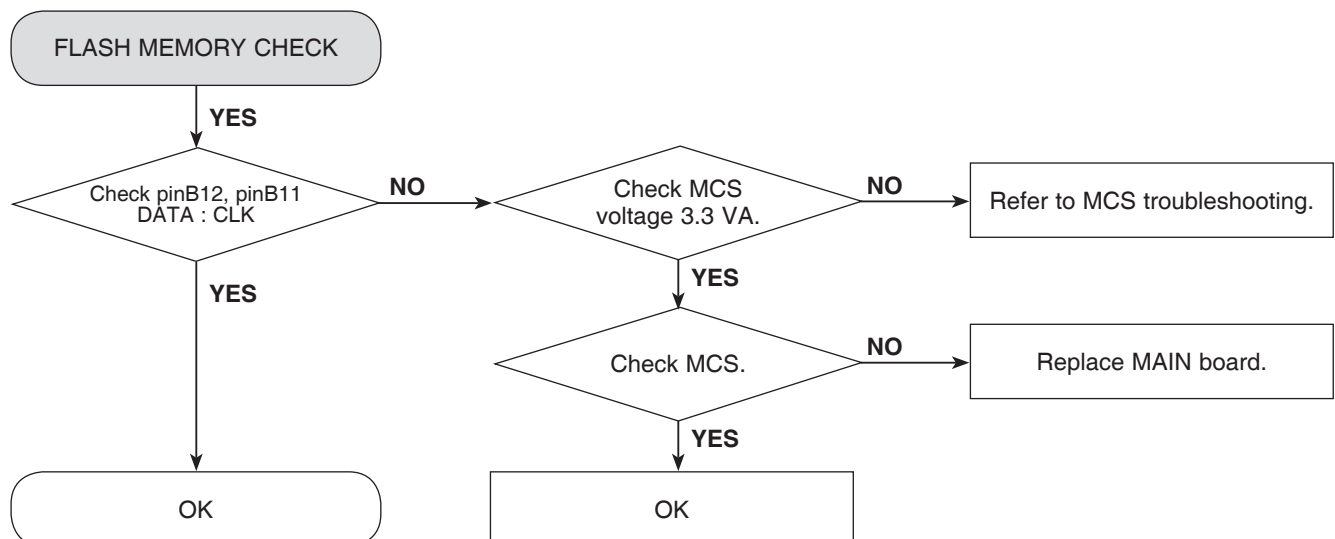


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## 2. MCS PART CHECK

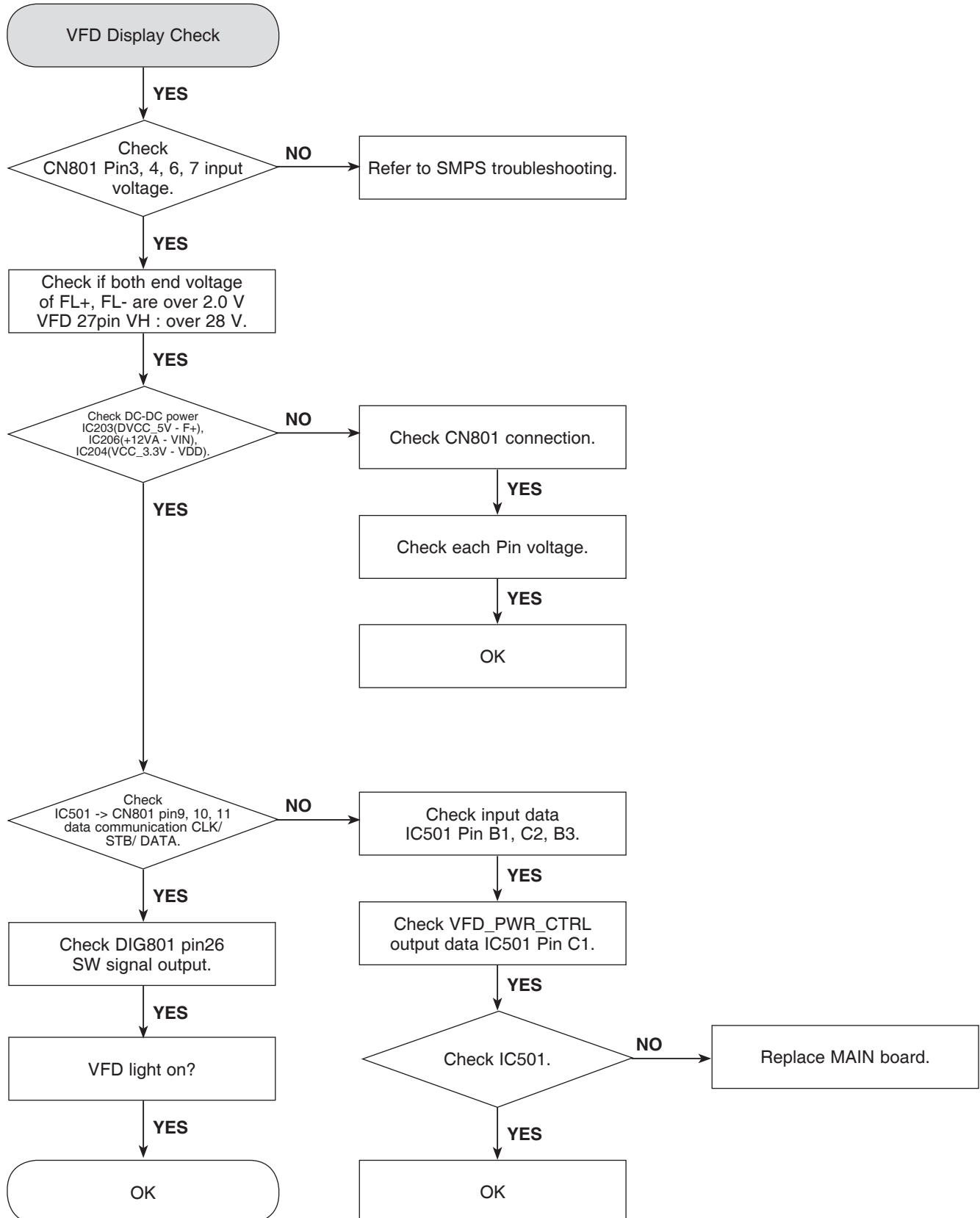


## 3. IC503 CHECK



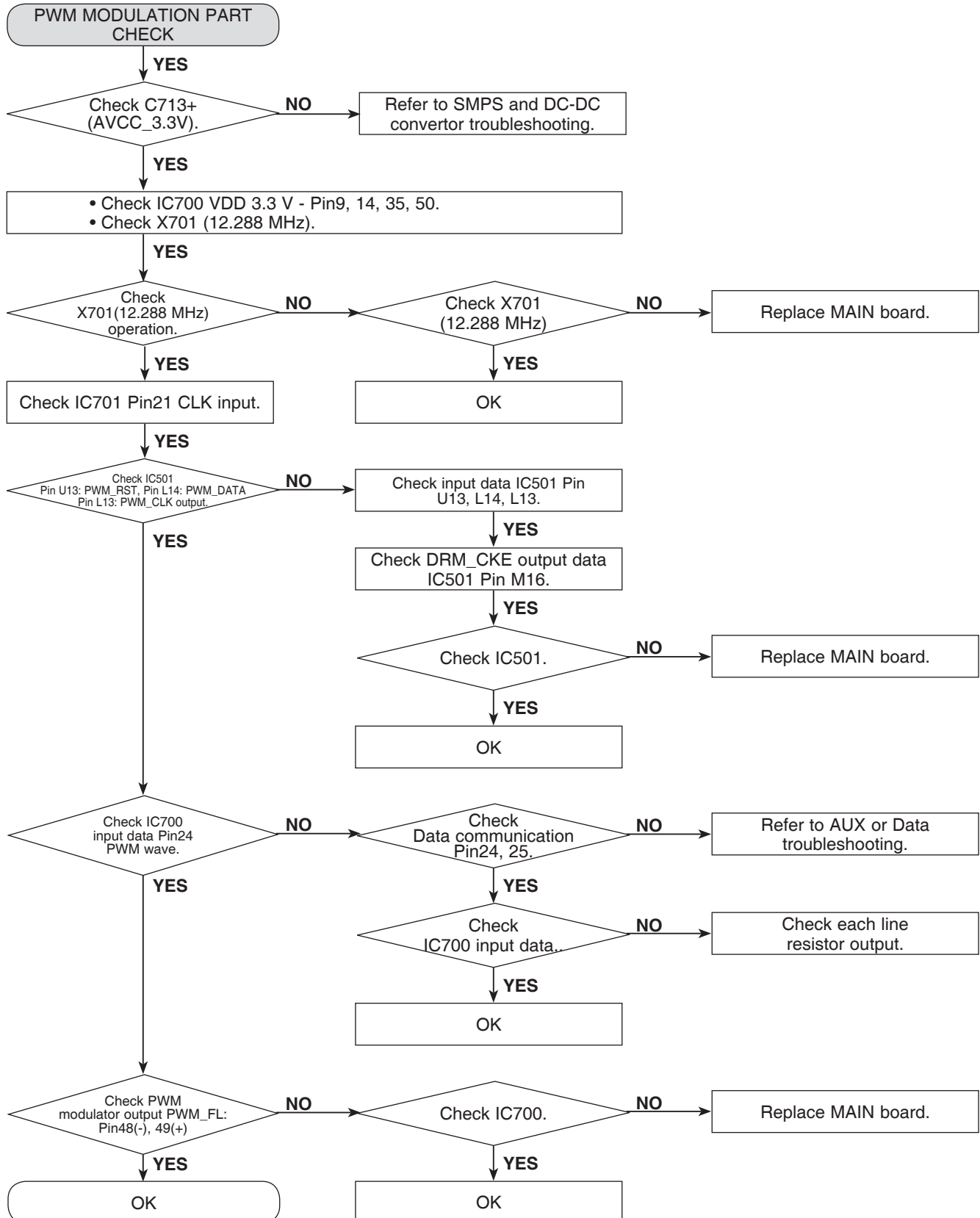
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## 4. VFD DISPLAY CHECK



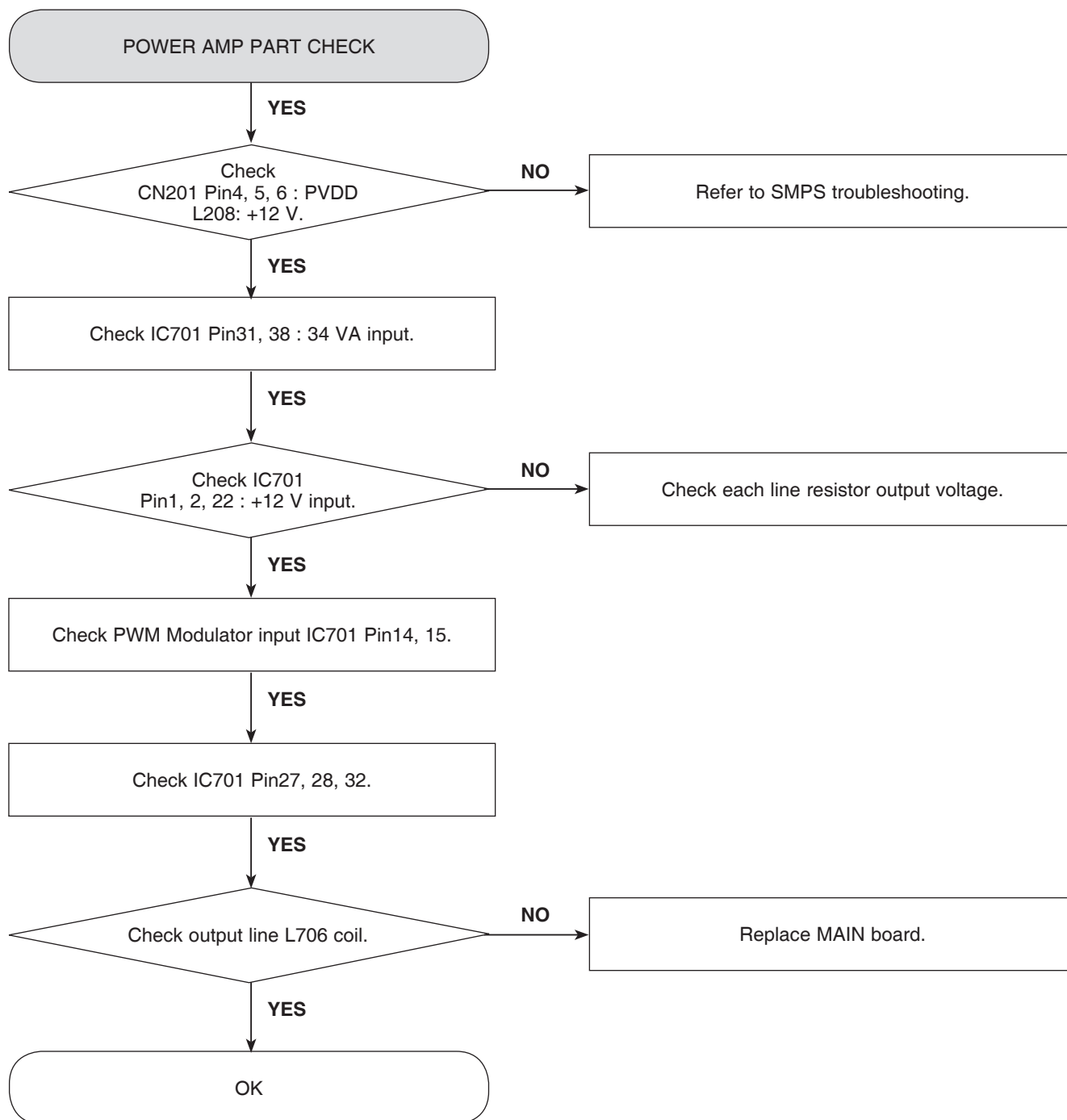
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## 5. PWM MODULATION CHECK



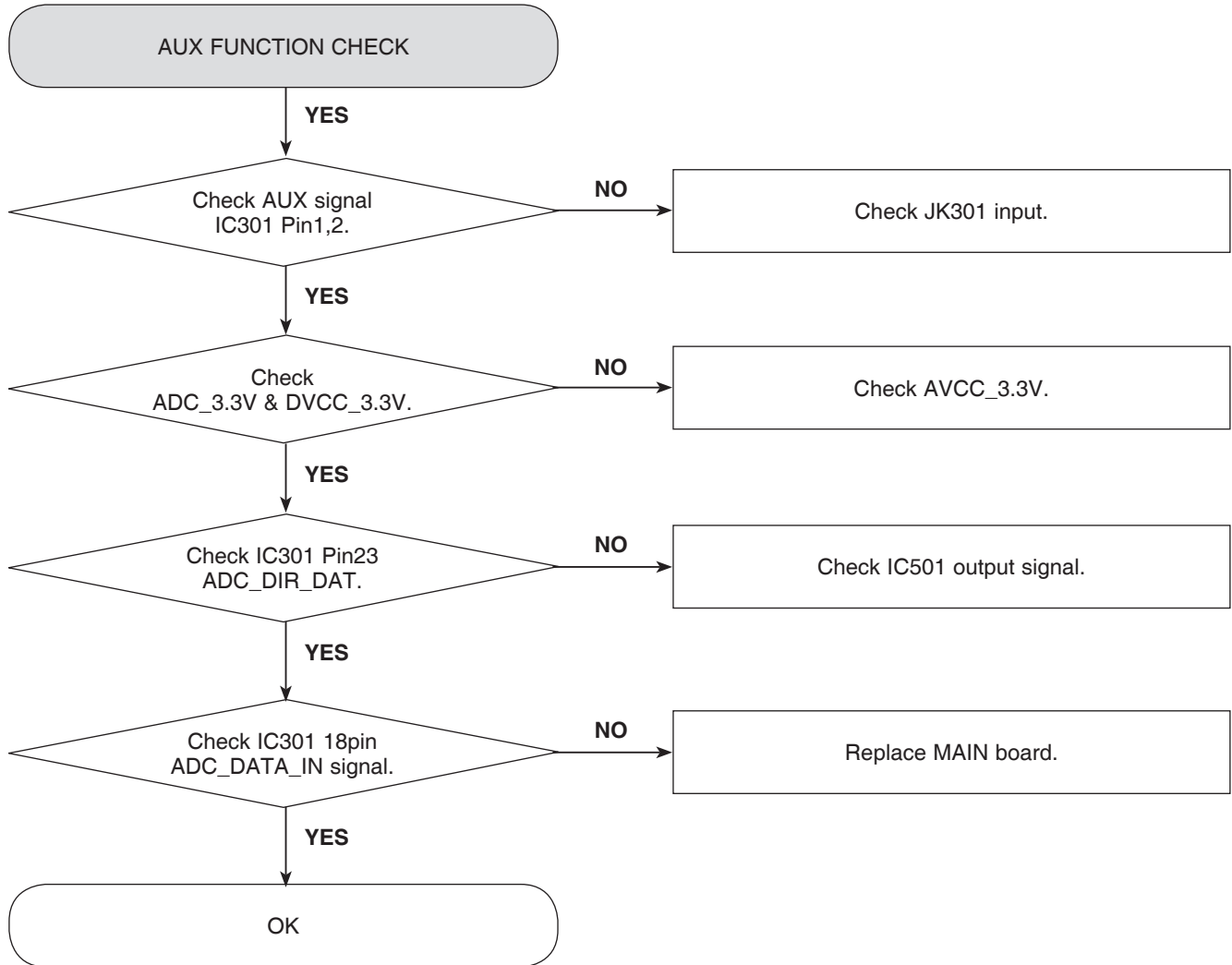
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## 6. POWER AMP PART CHECK



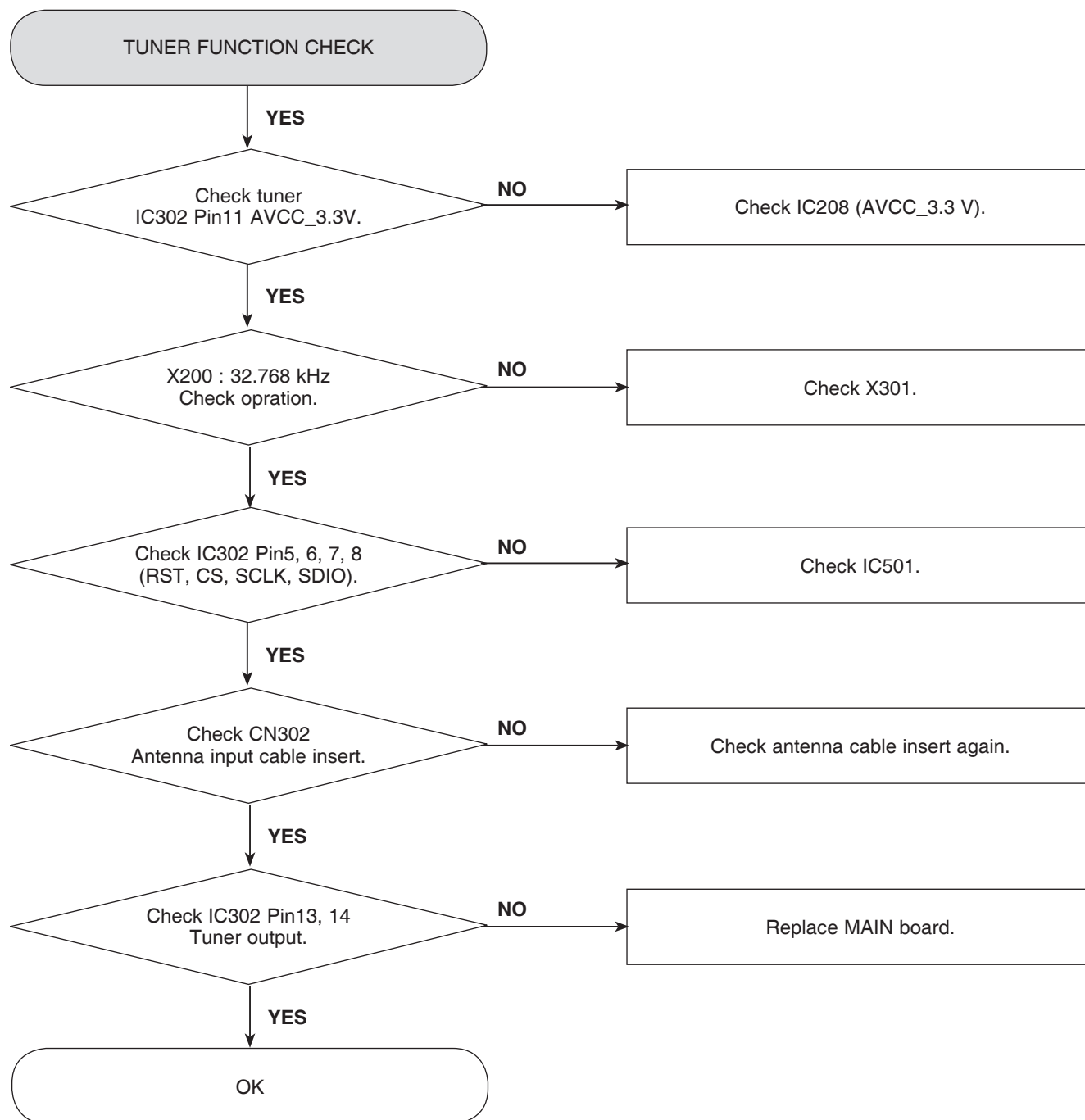
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## 7. AUX FUNCTION CHECK



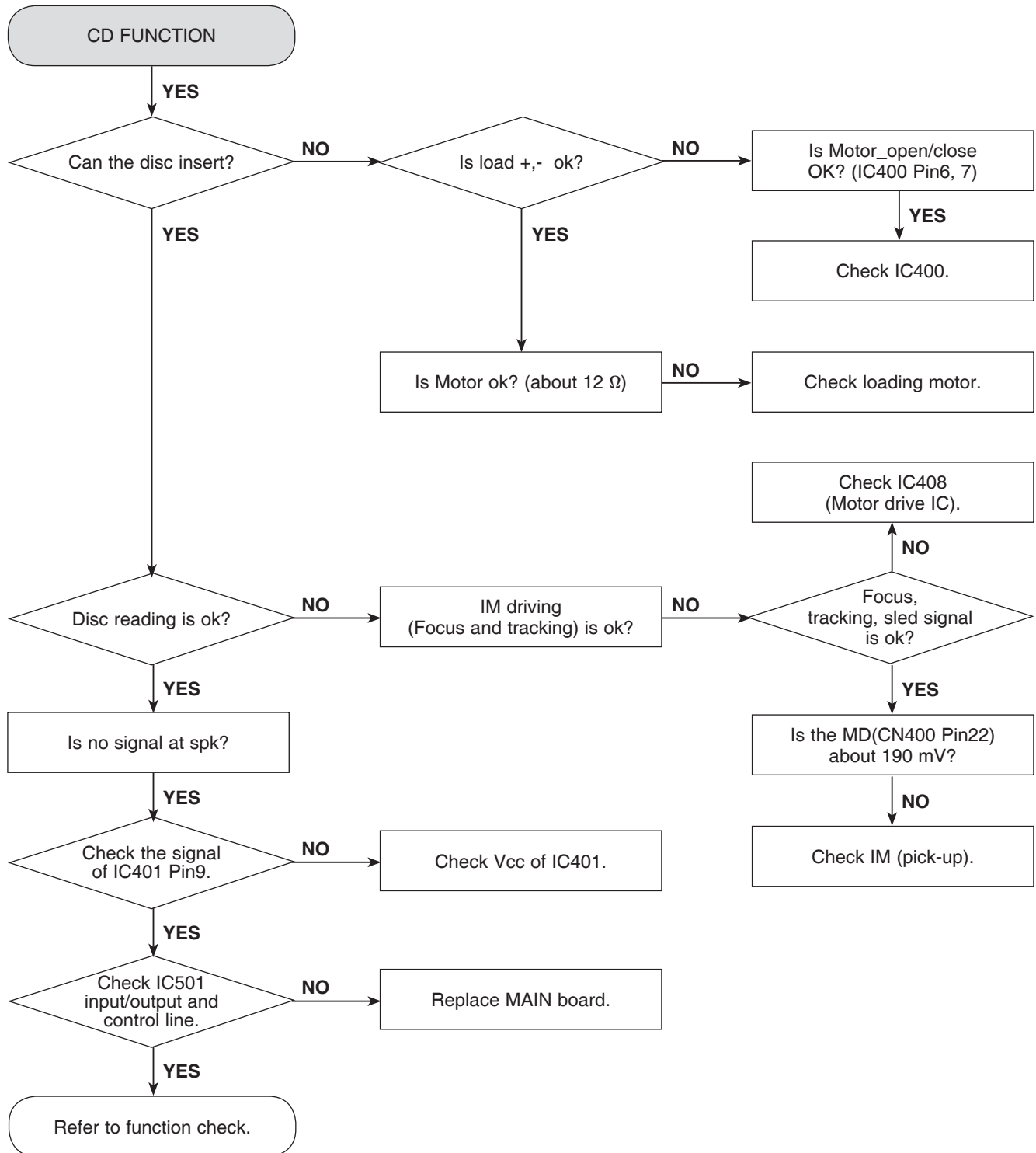
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## 8. TUNER FUNCTION CHECK



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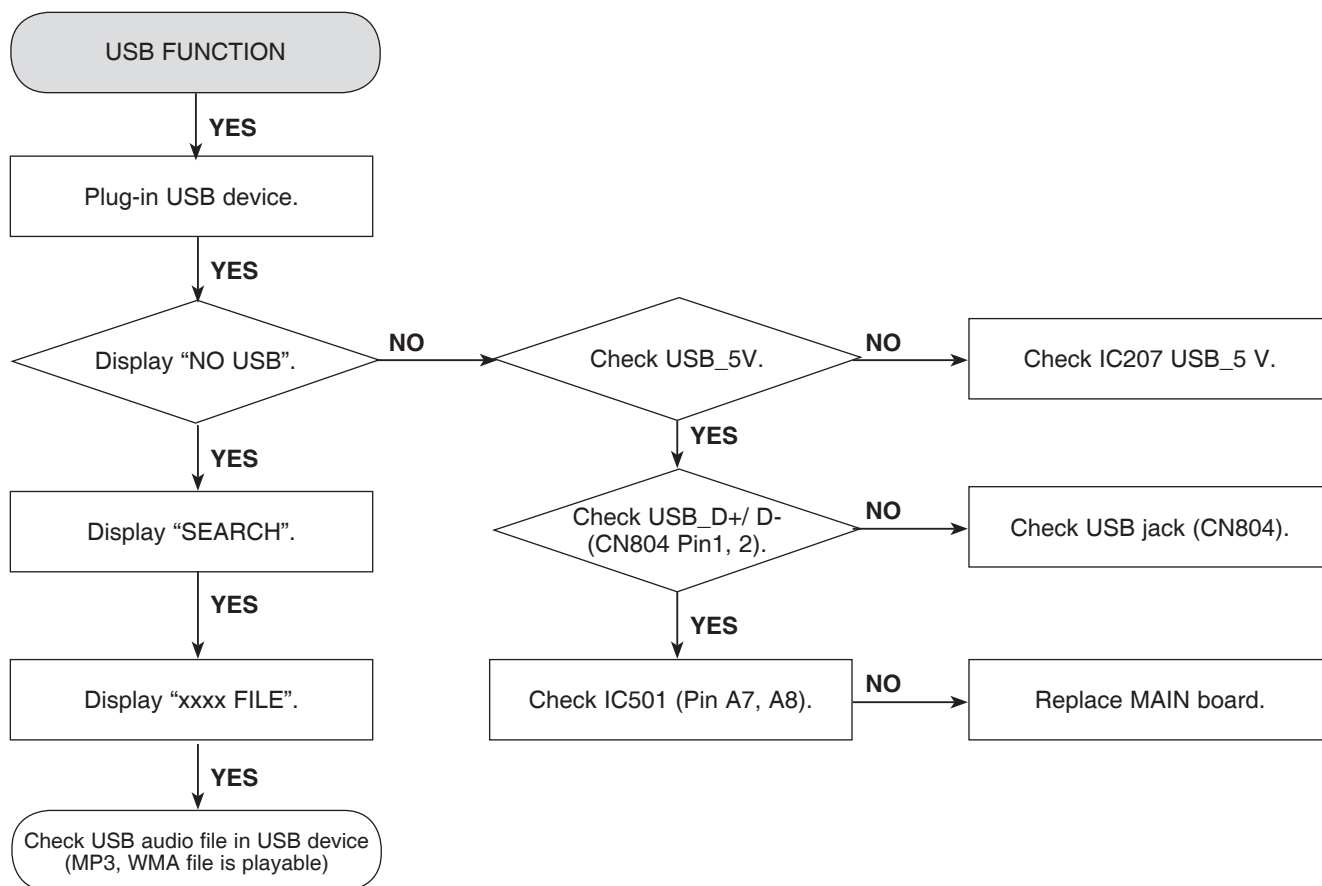
## 9. CD FUNCTION CHECK





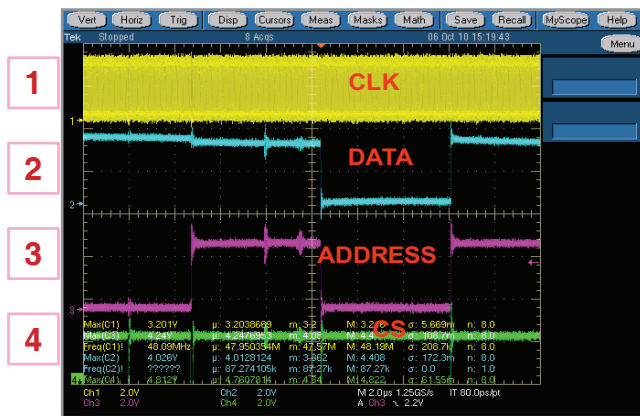
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## 10. SINGLE USB FUNCTION

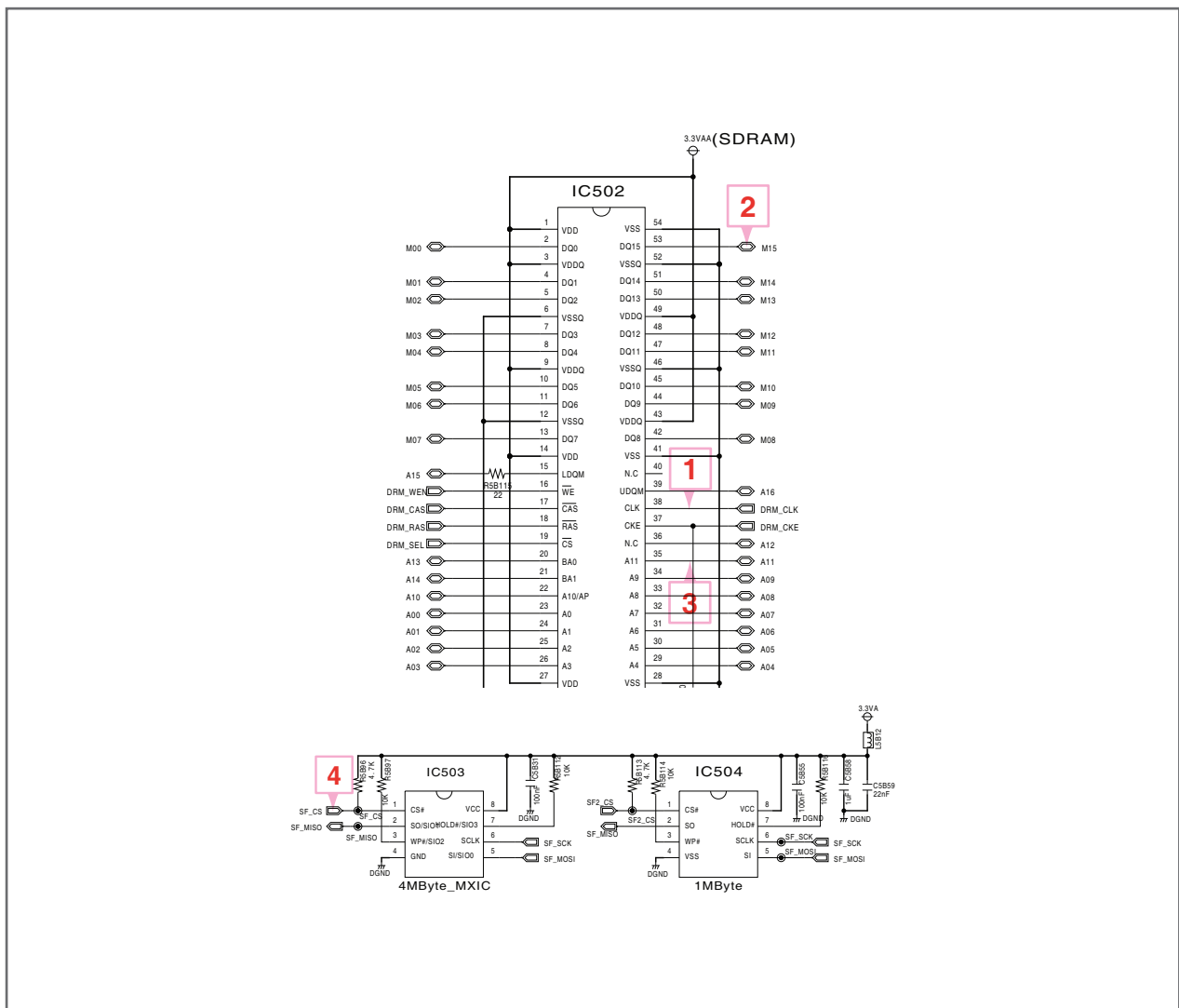


# WAVEFORMS OF MAJOR CHECK POINT

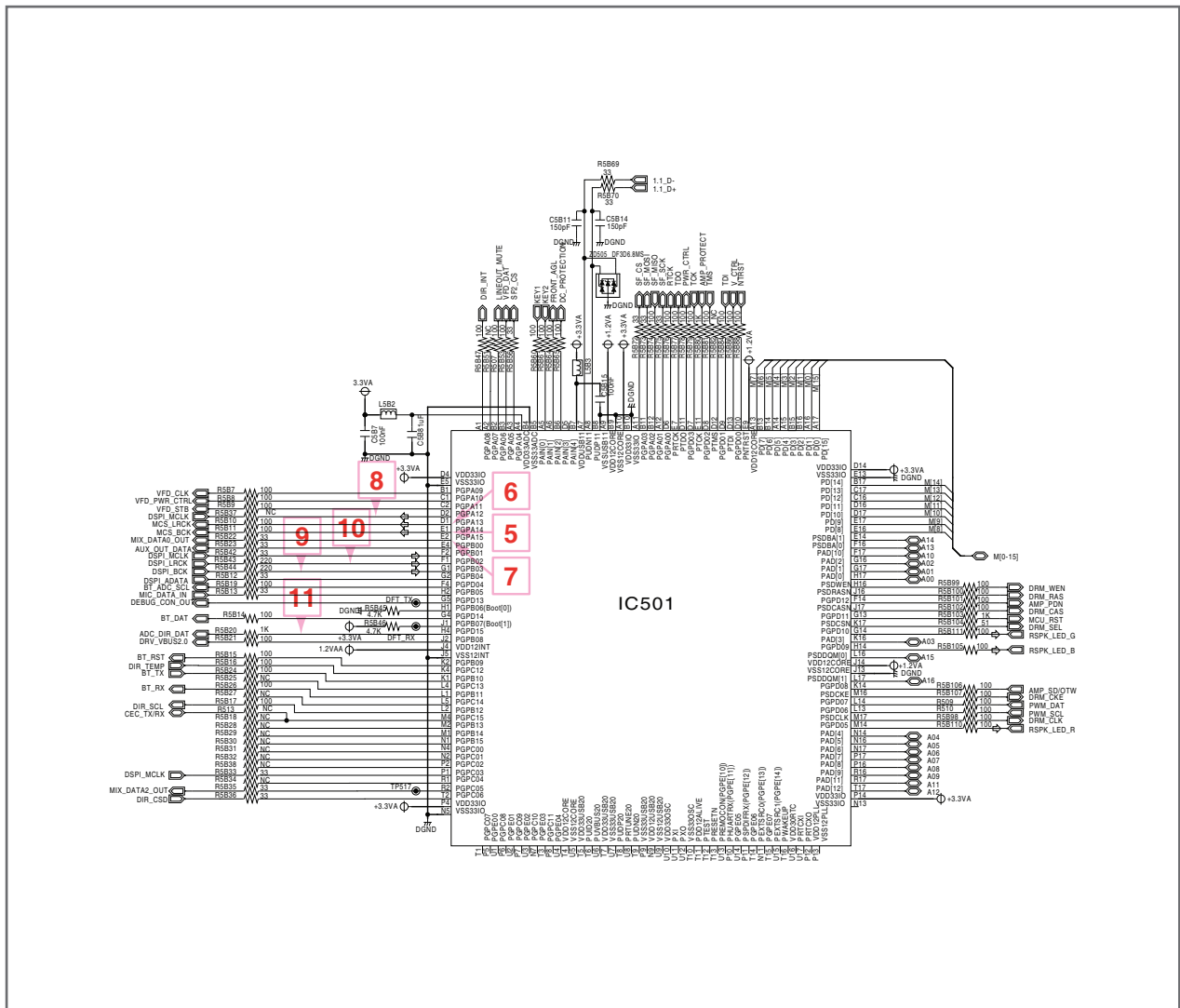
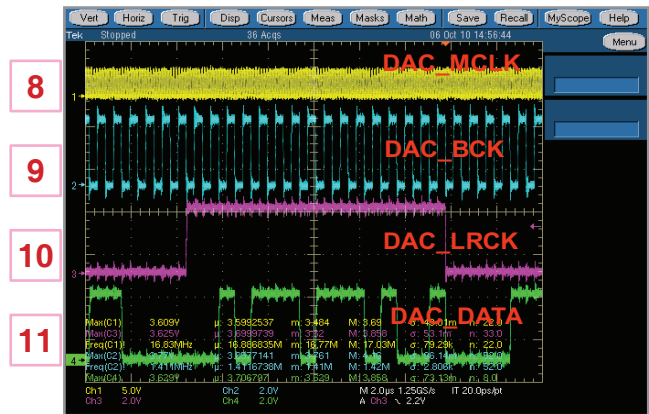
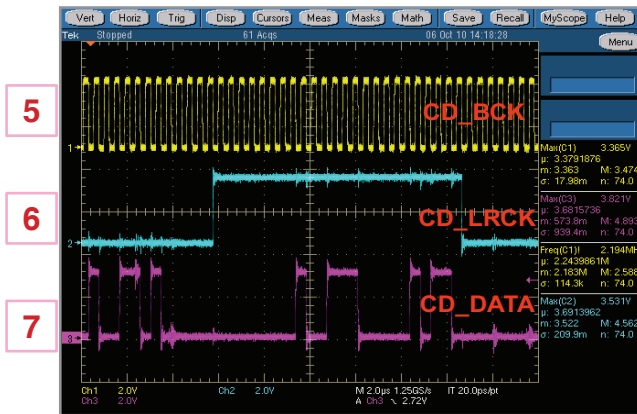
## 1. SDRAM



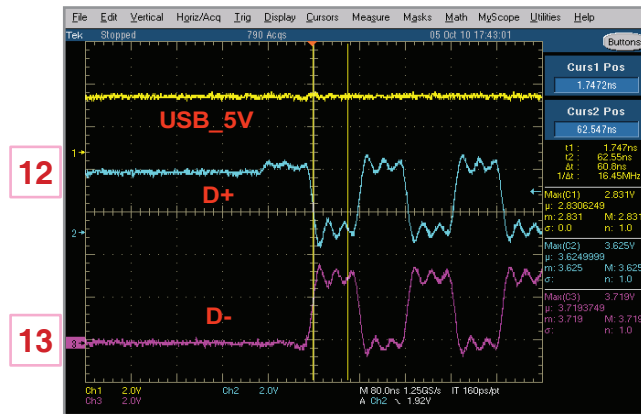
1. IC502 pin38, 2. IC502 pin53  
3. IC502 pin35, 4. IC503 pin1



## 2. AUDIO PATH

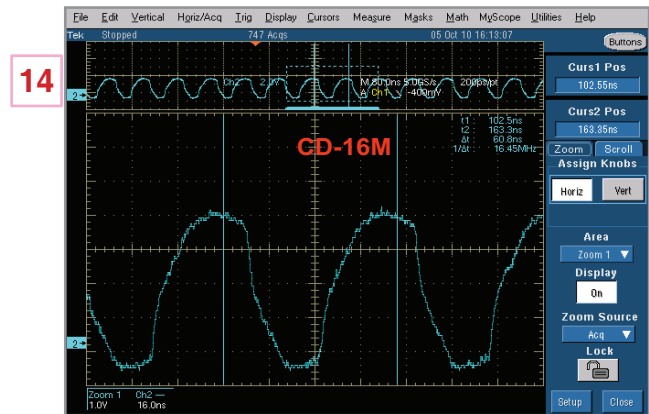


### 3. USB

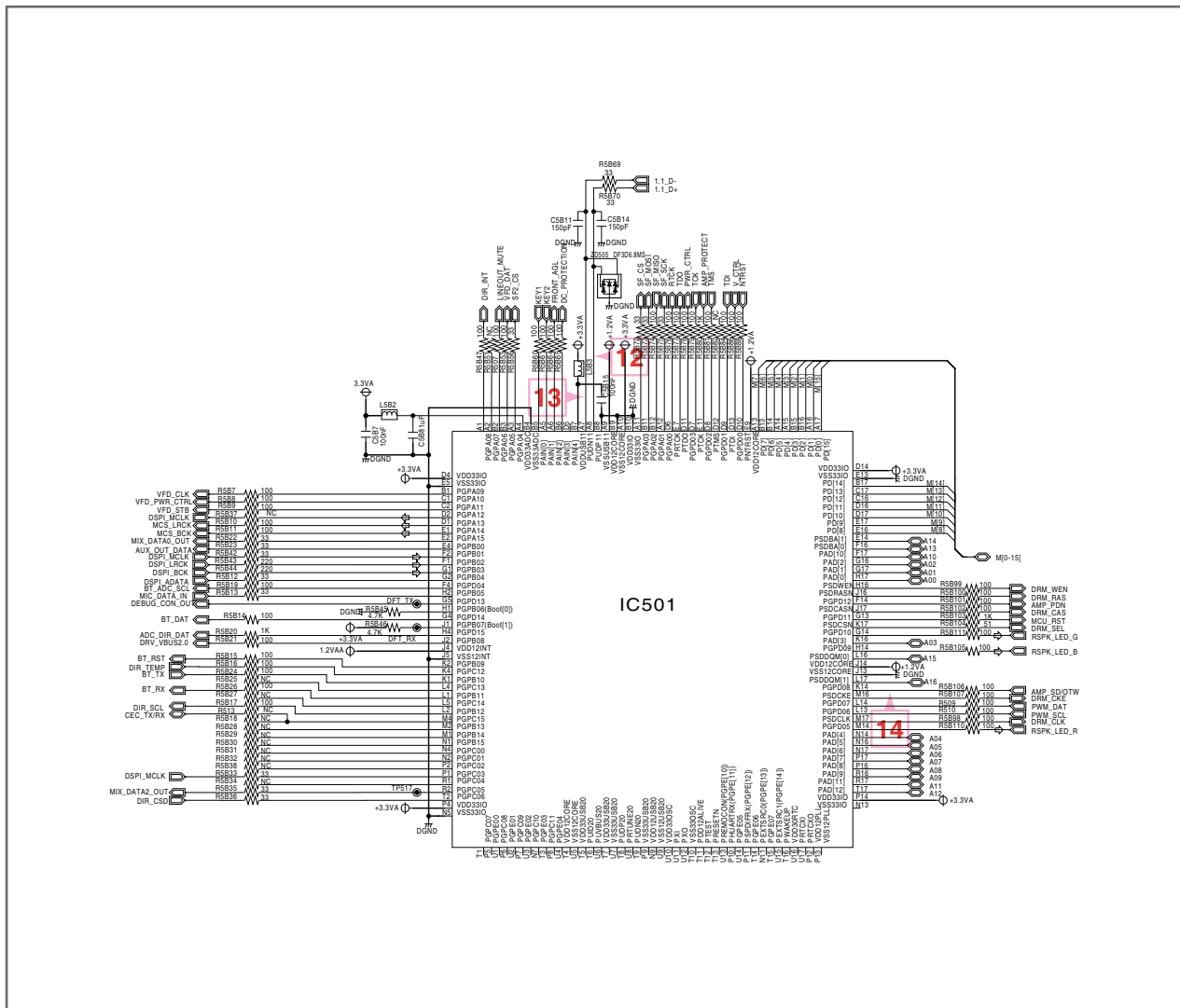


12. IC501 pin A8, 13. IC501 pin A7

### 4. SERVO

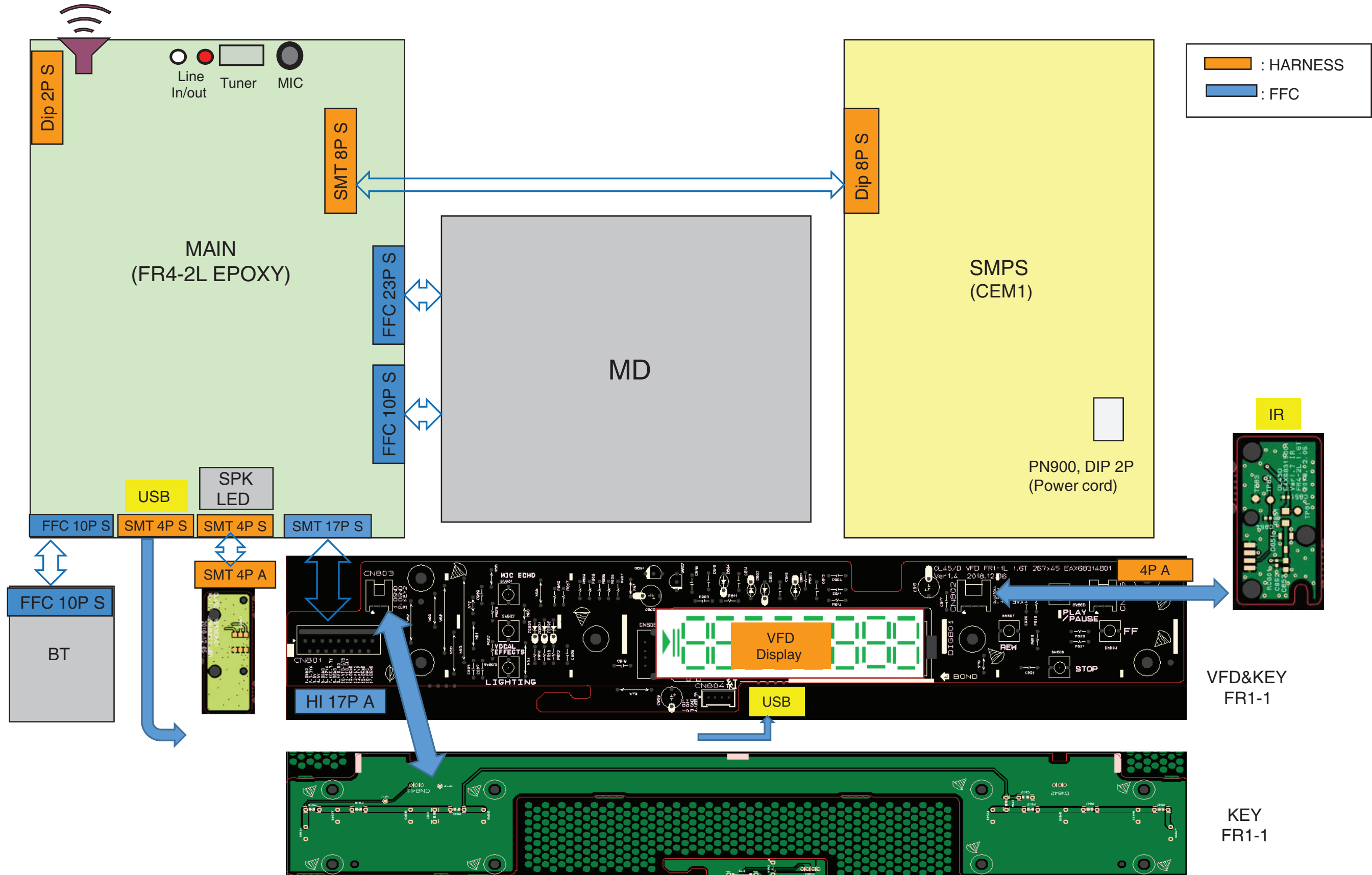


14. IC501 pin M16

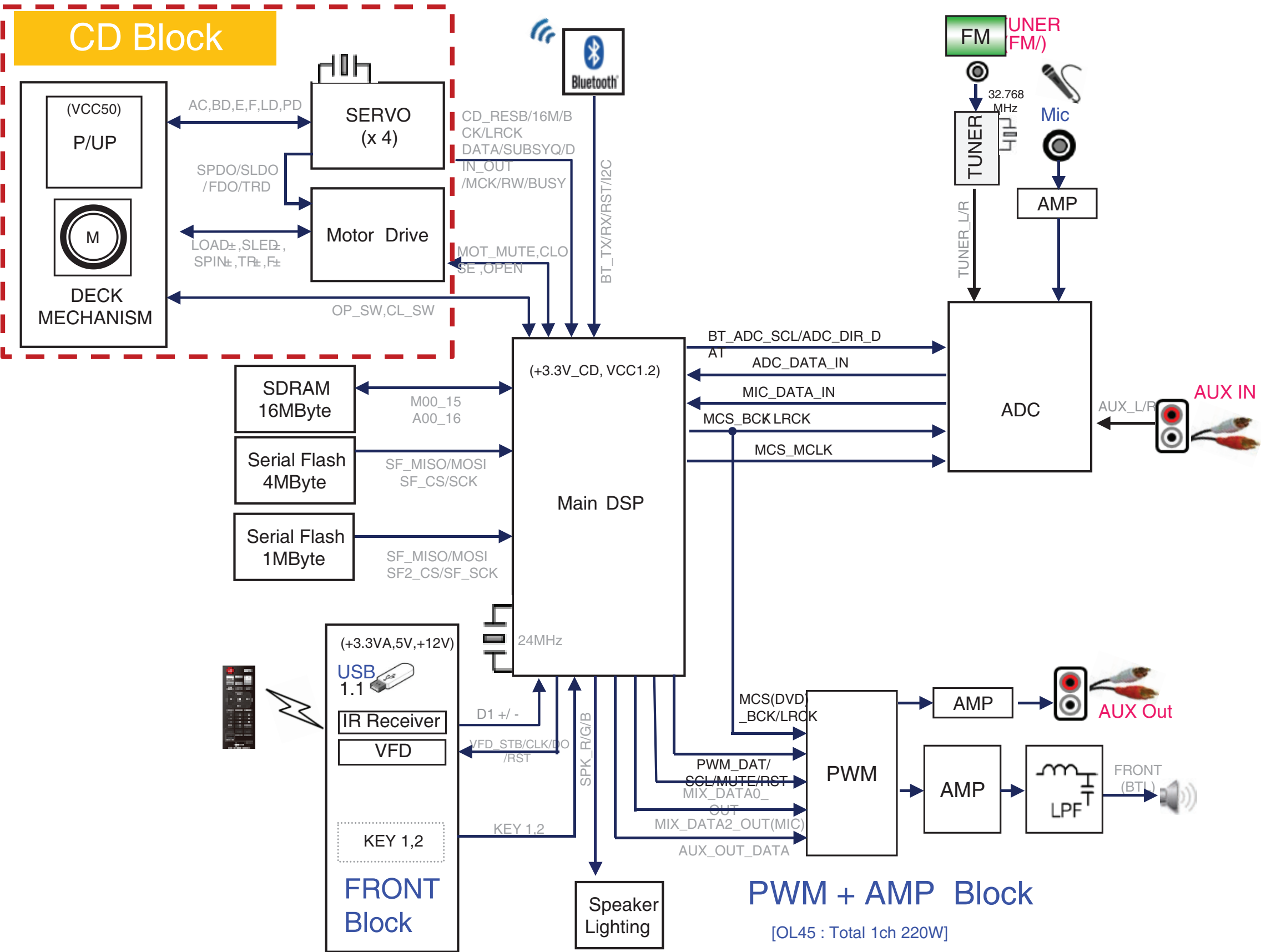


# MEMO

WIRING DIAGRAM



# BLOCK DIAGRAM





# CIRCUIT VOLTAGE CHART

## 1. ICs

| NO. | PARTS                                       | SPEC.  | Rating -20% ( V, Hz)<br>Rating +20% ( V, Hz) | Measure Data                       |
|-----|---|--|--|------------------------------------|
|     |   | (V, mW)  | Voltage (V)                                  | Voltage (V)                        |
| 1   | IC201<br>DC-DC Converter                    | VIN : 4.5V TO 24V                                | Vin : 12VA,<br>Vout : 5.1VA                  | Vin : 12.1V<br>Vout : 5.22V        |
| 2   | IC202<br>DC-DC Converter                    | VIN : 4.5V TO 24V                                | Vin : 12VA,<br>Vout : 3.3VA                  | Vin : 12.12V<br>Vout : 3.361V      |
| 3   | IC203<br>Limit Switch                       | VIN : 2.5V TO 5.5V                               | Vin : 5.1VA,<br>Vout : 5V                    | Vin : 5.21VA,<br>Vout : 5.2V       |
| 4   | IC204<br>Limit Switch                       | VIN : 2.5V TO 5.5V                               | Vin : 3.3VA,<br>Vout : 3.3V                  | Vin : 3.35VA,<br>Vout : 3.349V     |
| 5   | IC205<br>DC-DC Converter                    | VIN : 4.5V TO 24V                                | Vin : 12VA,<br>Vout : 1.2VA"                 | Vin : 12.12V<br>Vout : 1.236V      |
| 6   | IC206<br>DC-DC Converter                    | VIN :4.5V TO 45V                                 | Vin : 34VA,<br>Vout : 12VA                   | Vin : 34.92VA,<br>Vout : 12.18V    |
| 7   | IC207<br>Limit Switch                       | VIN : 2.5V TO 5.5V                               | Vin : 5.1VA,<br>Vout : 5V                    | Vin : 5.20VA,<br>Vout : 5.20V"     |
| 8   | IC208<br>LDO Voltage Regulator              | VIN : 2.5V TO 5.5V                               | Vin : 5.1VA,<br>Vout : 3.3V                  | Vin : 5.17V<br>Vout : 3.357V       |
| 9   | IC209<br>Limit Switch                       | VIN : 2.5V TO 5.5V                               | Vin : 5.1VA,<br>Vout : 5V                    | Vin : 5.2VA,<br>Vout : 5.2V        |
| 10  | IC301<br>4ch Audio ADC                      | VIN : -0.3V to 3.9V                              | AVDD : 3.3V                                  | AVDD : 3.346V                      |
| 11  | IC302<br>TUNER                              | VDD:3~3.6V                                       | VDD:3.3V                                     | VDD:3.359V                         |
| 12  | IC303<br>Line Driver                        | VDD:3~3.6V                                       | VDD : 3.3V                                   | VDD : 3.356V                       |
| 13  | ICA301<br>Line Driver                       | VDD:3~5.5V                                       | AVDD : 3.3V                                  | AVDD : 3.354V                      |
| 14  | IC400<br>Motor Driver                       | VCC1 : 4.3~13.2V<br>VCC2 : 4.3~VCC1              | VCC1 : 5.0V<br>VCC2 : 5.0V                   | VCC1 : 5.2V<br>VCC2 : 5.2V         |
| 15  | IC401<br>digital servo signal<br>processing | VDD1 : 2.7~3.6V (Analog)<br>VDD_CORE : 1.4~1.65V | VCC : 3.3V                                   | VCC : 3.28V                        |
| 16  | IC501<br>IC,Digital Signal Processors       | Digital Power 3.3V or 1.2V                       | VDD33 : 3.3VA<br>VDD12 : 1.2VA               | VDD33 : 3.348VA<br>VDD12 : 1.235VA |
| 17  | IC502<br>IC,SDRAM                           | VDD : 3.0~3.6V                                   | VCC : 3.3V                                   | VCC : 3.326V                       |
| 18  | IC503<br>Serial Flash Memory                | VDD : 3.0~3.6V                                   | VCC : 3.3V                                   | VCC : 3.35V                        |
| 19  | IC504<br>Serial Flash Memory                | VDD : 3.0~3.6V                                   | VCC : 3.3V                                   | VCC : 3.349V                       |
| 20  | IC505<br>IC, Reset                          | VIN:1.1~5.5V                                     | Vin : 3.1~3.3VA                              | VDD : 3.334                        |
| 21  | IC700<br>Sound/Audio Processor              | AVDD : 3.0~3.6V                                  | AVDD : 3.3V                                  | AVDD : 3.347V                      |
| 22  | IC701<br>AUDIO AMPLIFIER                    | VDD : 10.8 ~13.2                                 | VDD : 12V<br>PVDD : 34V                      | VDD : 11.95V<br>PVDD : 34V         |

## 2. CAPACITORS

| Part  | Capacitance | Rating -20 %<br>(88 V, 60 Hz) | Rating +20 %<br>(288 V, 60 Hz) | Contents         |
|-------|-------------|-------------------------------|--------------------------------|------------------|
|       |             | Voltage (V)                   | Voltage (V)                    |                  |
| C257  | 470uF       | +12V                          | 12.16                          | +12V             |
| C271  | 220uF       | USB_5V                        | 5.21                           | USB_5V           |
| C345  | 220uF       | AVCC_3.3V                     | 3.36                           | AVC_3.3V / TUNER |
| C5B21 | 220uF       | VDD_CORE                      | 2.99                           | MCS_RCT_3.0      |
| C713  | 100uF       | AVCC_3.3V                     | 3.34                           | AVCC_3.3V        |
| C719  | 470uF       | PVDD                          | 34.91                          | 34VA             |
| C802  | 47uF        | F-                            | 3.05                           | F-               |
| C809  | 100uF       | USB_5V                        | 5.21                           | USB_5V           |
| C810  | 1uF         | VFD_12V                       | 12.00                          | VFD_12V          |
| C811  | 1uF         | DVCC_3.3V                     | 3.295                          | VFD_VDD          |
| C812  | 47uF        | F+                            | 5.14                           | F+ (VCC_5V)      |
| C813  | 1uF         | VH                            | 29.99                          | VH               |
| C814  | 1uF         | VH                            | 21.07                          | VH               |
| C815  | 1uF         | VH                            | 8.93                           | VH               |
| C816  | 1uF         | VH                            | 10.55                          | VH               |

3. CONNECTORS

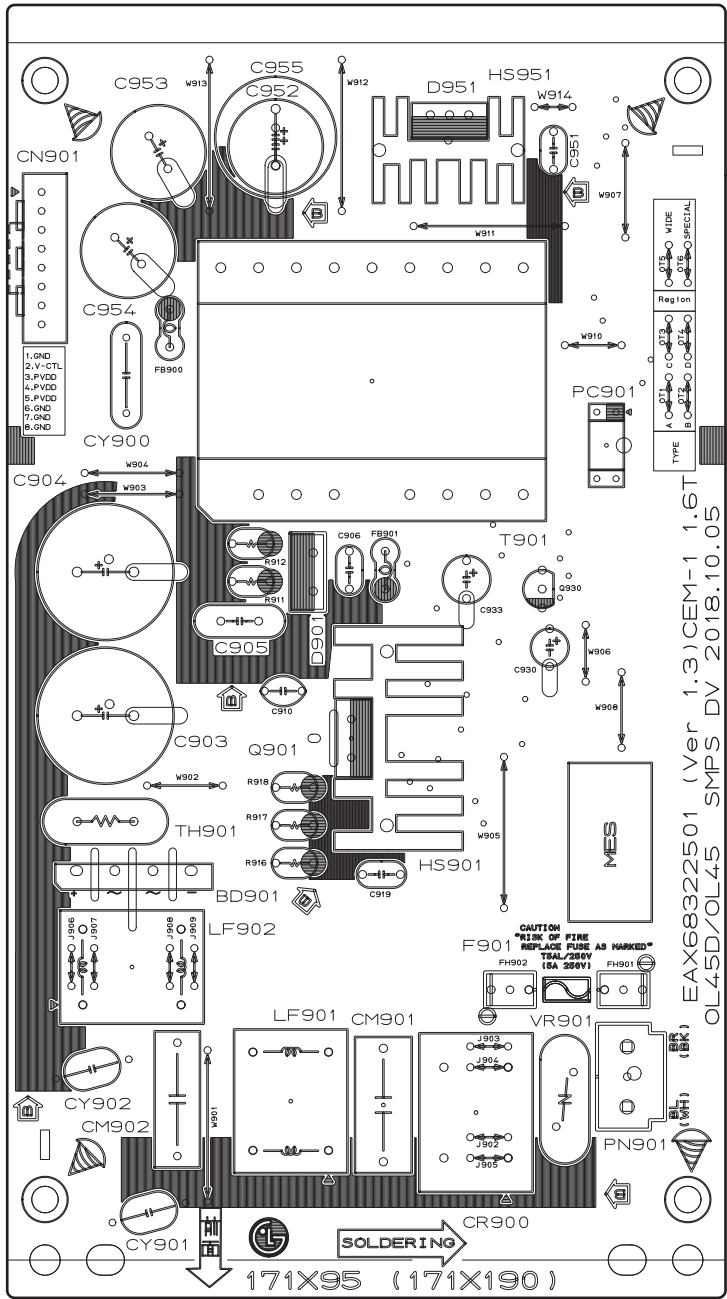
| NO | CON No. | Connector Name      | PIN No. | PIN MANE | Voltage (V) |        | CON No.   |
|----|---------|---------------------|---------|----------|-------------|--------|-----------|
|    |         |                     |         |          | Vin         | Vout   |           |
| 1  | CN304   | MAIN ↔ TOP(USB)     | 1       | USB5V    | 5.210       | 5.210  | CN804     |
|    |         |                     | 2       | GND      | 0.000       | 0.000  |           |
|    |         |                     | 3       | D+       | 0.120       | 0.100  |           |
|    |         |                     | 4       | D-       | 0.120       | 0.100  |           |
| 2  | CN504   | MAIN ↔ BT Moudle    | 1       | SDA      | 0.127       | 0.127  | BT Module |
|    |         |                     | 2       | SCL      | 3.330       | 3.330  |           |
|    |         |                     | 3       | GND      | 0.000       | 0.000  |           |
|    |         |                     | 4       | TXD      | 3.337       | 3.337  |           |
|    |         |                     | 5       | GND      | 0.000       | 0.000  |           |
|    |         |                     | 6       | RXD      | 3.316       | 3.310  |           |
|    |         |                     | 7       | RTS      | 3.317       | 3.310  |           |
|    |         |                     | 8       | CTS      | 0.077       | 0.077  |           |
|    |         |                     | 9       | RESET    | 3.336       | 3.335  |           |
|    |         |                     | 10      | VDD      | 3.318       | 3.318  |           |
| 3  | CN303   | MAIN ↔ TOP          | 1       | DGND     | 0.000       | 0.000  | CN801     |
|    |         |                     | 2       | RMC      | 3.179       | 3.178  |           |
|    |         |                     | 3       | DGND     | 0.000       | 0.000  |           |
|    |         |                     | 4       | KEY2     | 3.344       | 3.343  |           |
|    |         |                     | 5       | KEY1     | 3.344       | 3.343  |           |
|    |         |                     | 6       | DGND     | 0.000       | 0.000  |           |
|    |         |                     | 7       | VFD_CLK  | 3.260       | 3.259  |           |
|    |         |                     | 8       | VFD_STB  | 3.265       | 3.264  |           |
|    |         |                     | 9       | VFD_DO   | 3.262       | 3.261  |           |
|    |         |                     | 10      | DGND     | 0.000       | 0.000  |           |
|    |         |                     | 11      | VCC_3.3V | 3.297       | 3.296  |           |
|    |         |                     | 12      | +12VA    | 12.000      | 12.010 |           |
|    |         |                     | 13      | DGND     | 0.000       | 0.000  |           |
|    |         |                     | 14      | 5V       | 5.180       | 5.180  |           |
|    |         |                     | 15      | 5V       | 5.180       | 5.180  |           |
|    |         |                     | 16      | 3.3VA    | 3.306       | 3.305  |           |
|    |         |                     | 17      | DGND     | 0.000       | 0.000  |           |
| 4  | CN201   | MAIN ↔ SMPS         | 1       | GND      | 0.000       | 0.000  | CN901     |
|    |         |                     | 2       | GND      | 0.000       | 0.000  |           |
|    |         |                     | 3       | GND      | 0.000       | 0.000  |           |
|    |         |                     | 4       | PVDD     | 34.910      | 34.910 |           |
|    |         |                     | 5       | PVDD     | 34.910      | 34.910 |           |
|    |         |                     | 6       | PVDD     | 34.910      | 34.910 |           |
|    |         |                     | 7       | V_CTRL   | 2.982       | 2.982  |           |
|    |         |                     | 8       | GND      | 0.000       | 0.000  |           |
| 5  | CN301   | MAIN ↔ SPK Lighting | 1       | LED_GND  | 0.000       | 0.000  | CNS01     |
|    |         |                     | 2       | LED-R    | 0~3.7       | 0~3.7  |           |
|    |         |                     | 3       | LED-G    | 0~4.4       | 0~4.4  |           |
|    |         |                     | 4       | LED-B    | 0.000       | 0.000  |           |

| NO | CON No. | Connector Name             | PIN No. | PIN MANE       | Voltage (V) |       | CON No.      |
|----|---------|----------------------------|---------|----------------|-------------|-------|--------------|
|    |         |                            |         |                | Vin         | Vout  |              |
| 6  | CN400   | MAIN ↔ MD                  | 1       | NC/FHM-VCC     | 5.200       |       | MD           |
|    |         |                            | 2       | RF             | 1.445       |       |              |
|    |         |                            | 3       | DVD_LD         | 0.008       |       |              |
|    |         |                            | 4       | MON(COM)/5V    | 0.002       |       |              |
|    |         |                            | 5       | DVD_VR         | 0.008       |       |              |
|    |         |                            | 6       | GND            | 0.000       |       |              |
|    |         |                            | 7       | VREF/VC        | 2.009       |       |              |
|    |         |                            | 8       | VCC            | 5.200       |       |              |
|    |         |                            | 9       | F              | 2.010       |       |              |
|    |         |                            | 10      | E              | 2.006       |       |              |
|    |         |                            | 11      | A              | 2.003       |       |              |
|    |         |                            | 12      | D              | 2.008       |       |              |
|    |         |                            | 13      | C              | 2.003       |       |              |
|    |         |                            | 14      | B              | 2.004       |       |              |
|    |         |                            | 15      | F(+)           | 2.573       |       |              |
|    |         |                            | 16      | T(+)           | 2.553       |       |              |
|    |         |                            | 17      | T(-)           | 2.557       |       |              |
|    |         |                            | 18      | F(-)           | 2.572       |       |              |
|    |         |                            | 19      | SW_PDIC        | 0.020       |       |              |
|    |         |                            | 20      | GND            | 0.000       |       |              |
|    |         |                            | 21      | CD_LD          | 0.008       |       |              |
|    |         |                            | 22      | MON_MPD        | 0.008       |       |              |
|    |         |                            | 23      | CD_VR          | 0.008       |       |              |
| 7  | CN401   | MAIN ↔ MD                  | 1       | TRAY IN(OUTSW) | 3.026       |       | MD           |
|    |         |                            | 2       | LO-            | 0.001       |       |              |
|    |         |                            | 3       | TRAY OUT(INSW) | 3.238       |       |              |
|    |         |                            | 4       | LO+            | 0.001       |       |              |
|    |         |                            | 5       | GND            | 0.000       |       |              |
|    |         |                            | 6       | SP+            | 1.186       |       |              |
|    |         |                            | 7       | SL+            | 0.001       |       |              |
|    |         |                            | 8       | SP-            | 1.186       |       |              |
|    |         |                            | 9       | SL-            | 0.001       |       |              |
|    |         |                            | 10      | LDIN(SW_SLOT)  | 3.023       |       |              |
| 8  | CN302   | MAIN ↔ FM ANT<br>YAW025-02 | 1       | GND            |             |       | ANT          |
|    |         |                            | 2       | FM_ANT         |             |       |              |
| 9  | CN701   | MAIN ↔ SPK                 | 1       | SW+            | 17.430      |       | SPK          |
|    |         |                            | 2       | SW-            | 17.420      |       |              |
| 10 | CN802   | FRONT VFD ↔ RCU            | 1       | +3.3VA         | 3.292       | 3.292 | RCU<br>CN851 |
|    |         |                            | 2       | RMC            | 3.168       | 3.168 |              |
|    |         |                            | 3       | DGND           | 0.000       | 0.000 |              |
| 11 | CN841   | FRONT KEY ↔ FRONT VFD      | 1       | KEY2           | 3.342       | 3.341 | CN803        |
|    |         |                            | 2       | DGND           | 0.000       | 0.000 |              |
|    |         |                            | 3       | DGND           | 0.000       | 0.000 |              |

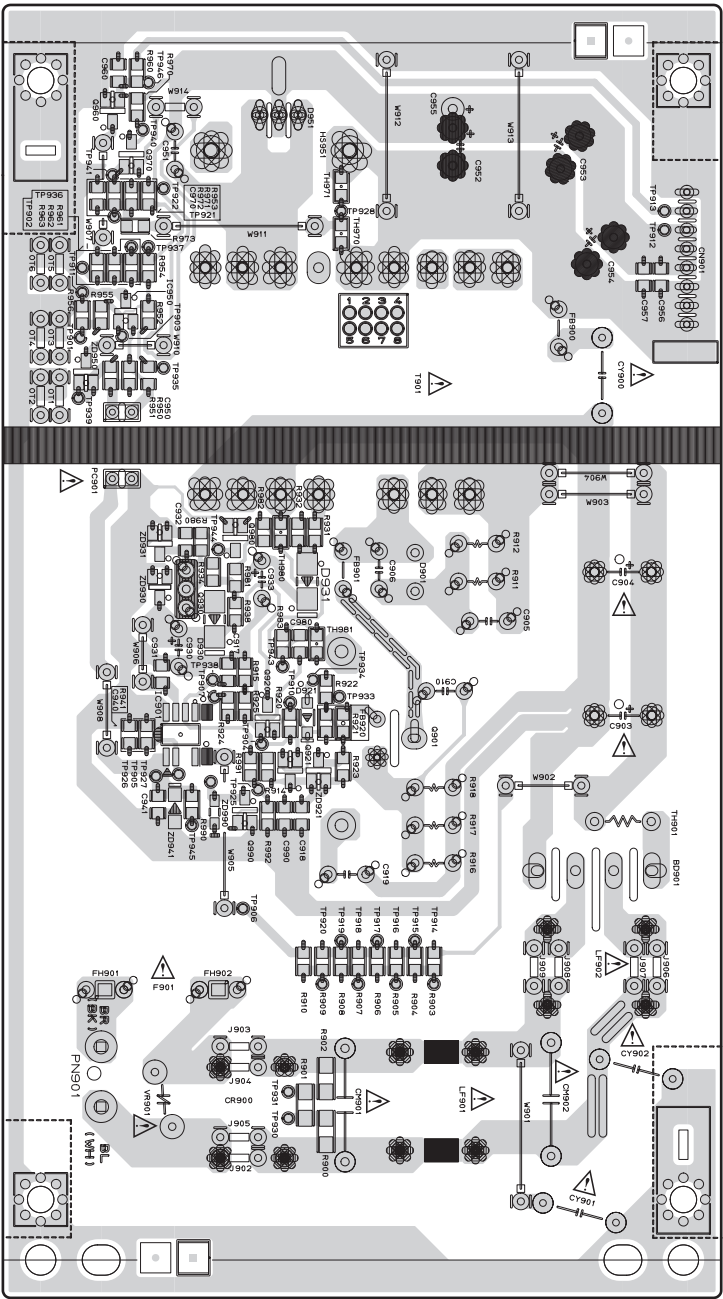
PRINTED CIRCUIT BOARD DIAGRAMS

1. SMPS P. C. BOARD

(TOP VIEW)

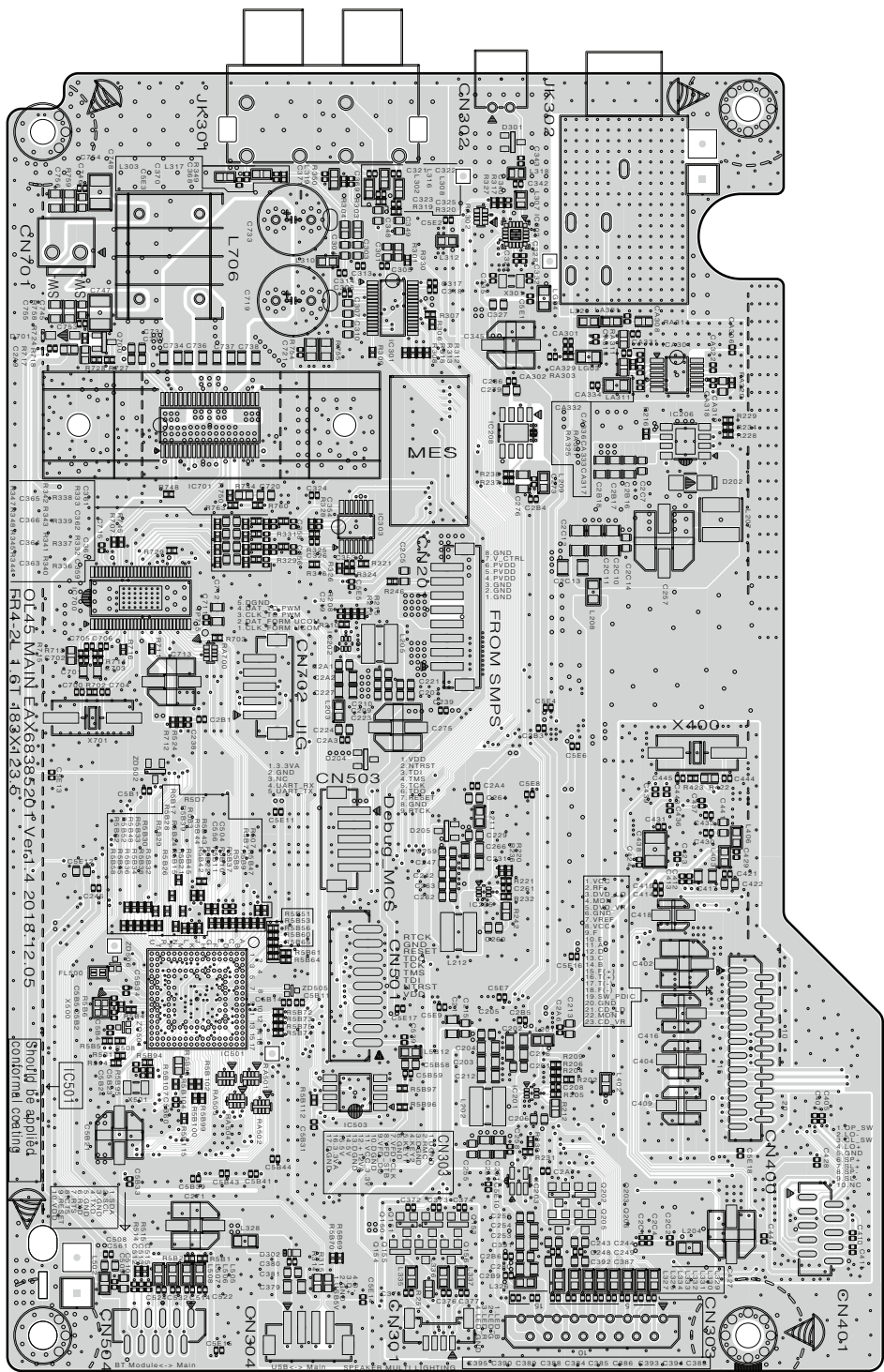


(BOTTOM VIEW)

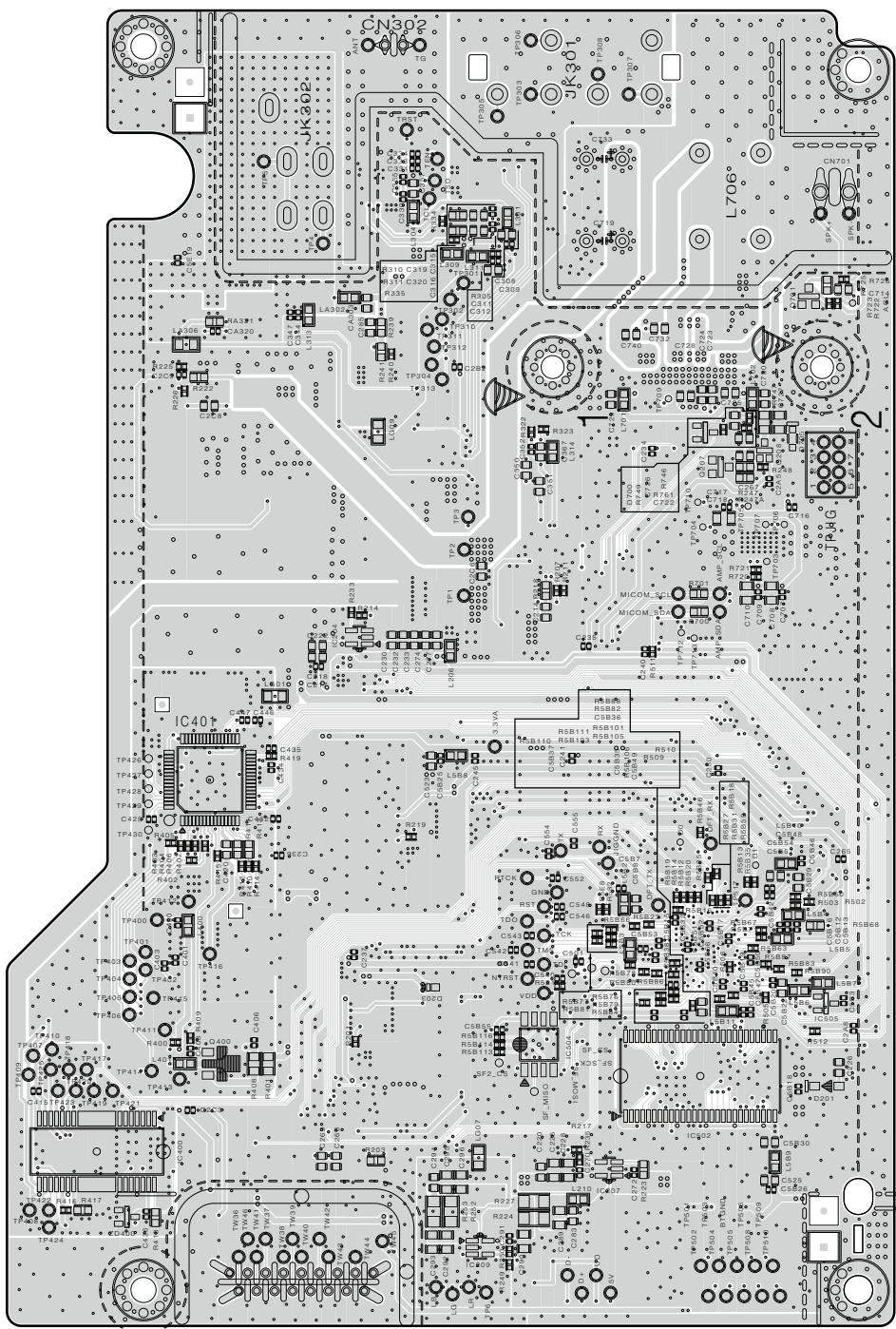


NOTE) Warning  
Parts that are critical with respect to risk  
of fire or electrical shock.

2. MAIN P. C. BOARD  
(TOP VIEW)

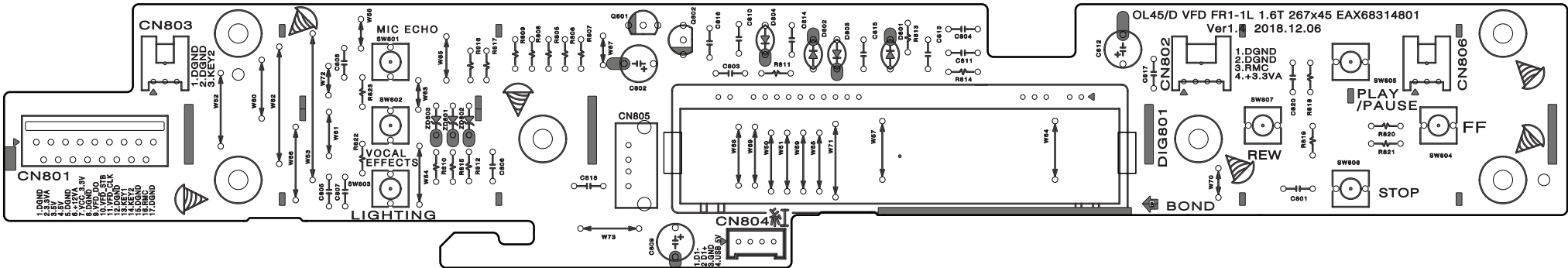


(BOTTOM VIEW)

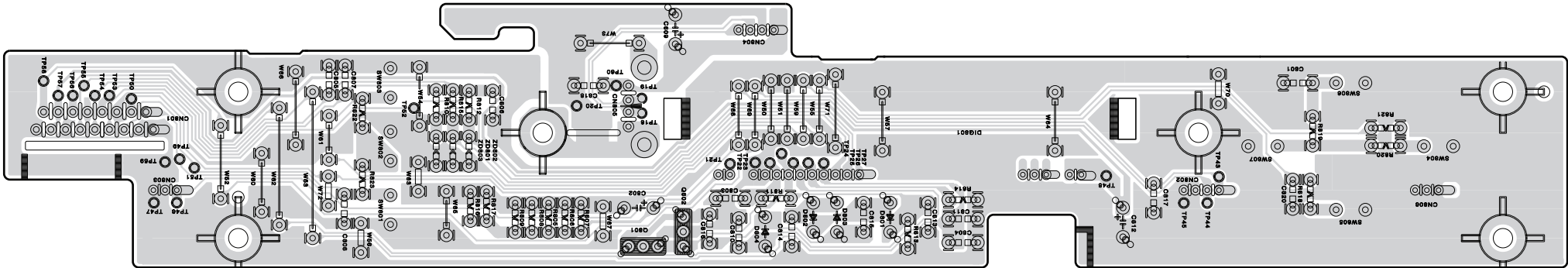




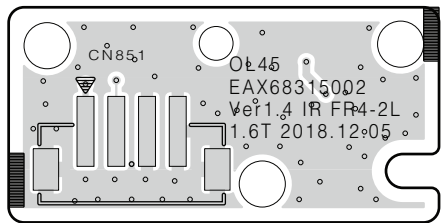
3. VFD P. C. BOARD  
(TOP VIEW)



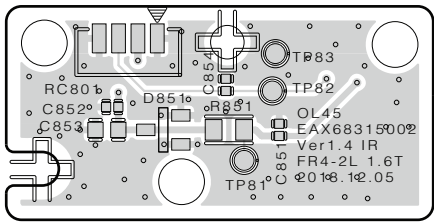
(BOTTOM VIEW)



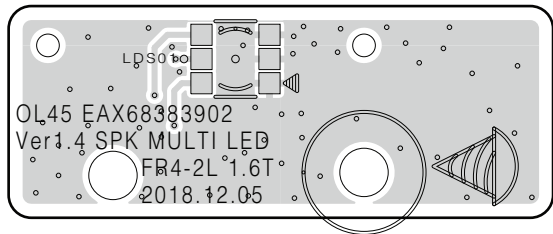
4. IR P. C. BOARD  
(TOP VIEW)



(BOTTOM VIEW)



5. SPEAKER MULTI LED P. C. BOARD  
(TOP VIEW)



(BOTTOM VIEW)

